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GENERAL TRANSPORT SITUATION

IN 1921

LEAGUE OF NATIONS

Conference on freedom of communication
= and transit. 1st, Barcelona, 1921

GENERAL TRANSPORT SITUATION

IN 1921

Statements submitted by the States which took part
in the First General Conference on Communications
and Transit, held in March-April 1921

WITH AN INTRODUCTION BY

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INTRODUCTION.

I.

Questionnaire on the Condition of Communications after the War.

The *General Conference on Communications and Transit* met at Barcelona in March and April 1921, in accordance with a decision taken by the Council of the League of Nations at its Rome Session (1921) under Article 23 (*e*) of the Covenant. It was then decided to invite all the States, including those which were not Members of the League, to forward a report on the condition of communications and transport in each country after the war, in reply to a questionnaire which will be found at the end of this introduction.

The following States replied to this invitation :

Austria,
Belgium,
Bolivia,
Brazil,
Bulgaria,
Canada,
Chile,
China,
Czecho-Slovakia,
Denmark,
Esthonia,
Finland,
France,
Germany,
Great Britain,
Greece,
Guatemala,
Haiti,
Hungary,
India,
Italy,
Japan,
Latvia,
Lithuania,
Luxemburg,
Netherlands and Dutch Indies,
Norway,
Panama,
Paraguay,
Persia,
Poland,
Portugal and Portuguese Colonies,
Roumania,
Serb-Croat-Slovene State,
Spain,
Sweden,
Switzerland.

The reports transmitted appear in the present volume in the order of this list.

The object of the enquiry was to show clearly the condition of communications and transport at the end of the world-war. It is generally admitted that economic life can only be restored to normal conditions if regular commerce is first guaranteed. It is obvious—there are innumerable signs which bear out this statement—that the means of communication must have suffered considerably as a result of the war. But our design, is to obtain, as far as possible, a quantitative estimate of the phenomenon to define its main features, to study its various aspects and to collect facts and information not merely for the purpose of satisfying a legitimate curiosity, but also in order to supply data calculated to facilitate and hasten the return to normal conditions at a time when the League is attempting to solve the most weighty problems of communications and transport.

The questionnaire was so drawn up as to furnish an exact guide for the drafting of the reports; it was, however, inevitable that, in replying to the questions, each country should adopt an individual point of view, and that the countries should, especially in the remarks annexed to the figures, give particular prominence to certain questions of special interest to them. It is also natural that, in their estimates of the situation, those countries which were victorious in the war should show a certain optimism, and that the conquered countries should tend to pessimism in their views on the present and future.

Nevertheless the effects of the war on transport have common features, but it is clear that these features vary more or less, and that the nature of the damage suffered also varies according to the position of the various countries, the part they played during the war, their distance from the theatre of war, and, lastly, according to the manifold circumstances which characterised the post-war situation. Apart from these considerations, if we bear in mind that, in each country, the writers of the memoranda were obsessed by certain problems which called for a speedy solution, and that, in several cases, the reconstitution of States on a different territorial basis made it impossible to utilise old statistical data or to obtain reliable new data, we see clearly why the reports are lacking in that homogeneity which would have made it possible to handle them with ease and derive immediate profit from them. This preface, which has been made as concise as the importance of the subject permits, aims at presenting this inquiry in a more accessible form, and grouping the main characteristics of the crisis through which the means of communications and transit passed after the war.

From this point of view it is necessary in the first place to discover the order in which the mass of facts and information in our possession should be summarised. Classification according to subject-matter corresponds to the form of the questionnaire. A distinction is drawn in the questionnaire between railways, ocean and inland navigation, and data relating to the less important questions of the development of motor and aerial transport. In this preface, we shall continue to lay stress on the distinction between ocean and inland navigation ; there are, indeed, considerable differences between the two classes of water transport, which are equally apparent in all the reports received. Further, the questionnaire adopts a subject classification which, treating railways and waterways separately, takes the following order : *(a)* Information regarding stock ; *(b)* regarding traffic; *(c)* regarding tariffs and freight rates; *(d)* regarding fuel, and *(e)* regarding the financial position of transport concerns.

But a territorial classification is also necessary for obvious reasons of method. The distinction between European and non-European countries immediately suggests itself. Although countries belonging to every quarter of the globe took part directly or indirectly in the war, Europe was the real seat of war, and its effects are much more far-reaching and evident there than elsewhere. The study of the changes which have taken place in the means of communication since the war will be primarily based on information dealing with European States.

For this reason, after giving a general survey of the phenomena common to all States, we shall in this work separate facts which concern Europe from those connected with the situation in extra-European countries, particularly as we have only an incomplete report from the latter, since, to cite an important example, the United States of America, whose statement would have been extremely interesting, failed to answer the questionnaire.

In the case of Europe, whenever it was found necessary we have adopted a territorial grouping. Thus, when we speak of Central Europe, we mean the following group of States : Sweden, Norway, Denmark, Germany, Czecho-Slovakia, Switzerland, Austria-Hungary, and Italy ; similarly, when we speak of Western Europe we mean : England, Belgium, the Netherlands, Luxemburg, France, Spain and Portugal ; and of Eastern Europe : Poland, Jugo-Slavia, Roumania, Greece, Finland, Esthonia, Latvia and Lithuania. We have no official information as regards Russia.

In our opinion it is impossible to form an accurate estimate of the present situation without being familiar with at least the main outlines of the pre-war situation.

From a purely statistical point of view, the last tables published before the war by the *Archiv für Eisenbahnwesen* with regard to world railway development may be used. They date from the year 1912 and contain information as to the total length of the various systems, the ratio of their development to the area and population of each country, the cost of construction and the method of management (government or private). We reproduce here only that part which deals with Europe, limiting ourselves to data concerning the absolute length of lines, or their length in proportion to the area of the country and the size of the population. We have added the present extent of the railways in the various States as they exist after the war whenever the documents at our disposal rendered this possible.

Country	Length of line in operation in 1912 (in Km.)	Area (Sq. Km.)	Population (in millions)	Length in operation per 100 Sq. Km.	Length in operation per 10,000 inhabitants	Length in operation in 1920
1. Germany	62,734	540,800	66.146	11.6	9.5	58,041
2. Austria-Hungary	45,823	676,500	51.018	6.8	9.0	—
Czecho-Slovakia[1]	—	139,000	13.000	10.0	10.0	13,594
Austria	—	—	—	—	—	6,326
Hungary	—	—	—	—	—	7,052
Serb-Croat-Slovene State	—	26,400	12.436	—	–	8,955
3. Great Britain	37,678	314,000	45.472	12.0	8.3	39,262
4. France	50,232	536,400	39.252	9.4	12.8	—
5 Russia, including Finland	62,198	5,390,000	128.171	1.2	4.8	—
Finland	–	—	–	—	--	3,984
Lithuania	2,821	85,000	4.500	—	—	3,120
Esthonia	—	—	—	—	—	991
Latvia	—	74,316	2.950	—	—	2,849
Poland	—	—	—	—	—	15,829
6. Italy	17,420	286,600	34.270	6.1	5.1	20,118
7. Belgium	8,660	29,500	7.386	29.3	11.7	—
8. Luxemburg	525	2,600	246	20.2	21.3	—
9. Netherlands	3,194	33,100	5.825	9.6	5.5	—
10. Switzerland	4,818	41,400	3.559	11.6	13.5	5,345
11. Spain	15,350	496,900	18.618	3.1	8.2	–
12. Portugal	2,983	92,600	5.429	3.2	5.5	—
13. Denmark	3,771	38,500	2.589	9.8	14.6	4,334
14. Norway	3,092	322,300	2.350	1.0	13.2	3,286
15. Sweden	14,272	447,900	5.476	3.3	26.1	14,887
16. Serbia	936	48,300	2.821	1.9	3.3	—
17. Roumania	3,607	131,300	6.860	2.7	5.3	11,678
18. Greece	1,609	64,700	2.632	2.5	6.1	2,942
19. Bulgaria	1,928	96,300	4.253	2.0	4.5	2,549
20. Turkey in Europe	1,684	169,300	6.130	1.0	2.7	—
21. Jersey, Malta and Isle of Man	110	1,100	372	10.0	3.0	—
Total for Europe	342,624	9,760,100	438.875	3.5	7.8	—

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[1] Names printed in italics denote those countries which were created by the treaties signed at the end of the war.

I.

RAILWAYS.

1. *State of Railway Communications before the War. — Organisation of International Transport.*

Before the recent war, Europe, and more especially Central and Western Europe, had enjoyed a long period of peace. This circumstance had given rise to an extensive development of railways—a development which was far more limited in Eastern Europe, as is shown in the preceding table—and had furthered the adoption of all measures calculated to increase the efficiency of transport. The effect of these measures was to eliminate the obstacles to freedom of trade presented by political and customs frontiers and the multiplicity of railway administration; thus they brought about an increase in the work performed by the railways, while the cost remained unchanged. In this respect it may be said that the railways of continental Europe, and, more especially, those of the central and western States, had arrived at an almost perfect system of internationalism, thanks to certain agreements concluded between the countries concerned, either on technical questions, or on the commercial relations established by the development of the railways.

The chief agreement of a technical nature is that regarding the "technical uniformity of railways" which resulted from successive conferences held at Berne from 1886 onwards, at the invitation of the Swiss Government, to which nearly all the European countries adhered (Switzerland, Germany, France, Austria-Hungary, Italy, Russia, Belgium, Sweden, Norway, Denmark, Bulgaria, the Netherlands, Roumania, Greece, Luxemburg and Serbia). At these conferences the essential dimensions of the track (gauge) and of all parts of the rolling-stock affected by this gauge were determined, together with the formation of trains, each State undertaking to enforce the adoption of these dimensions by law. The agreement was to be perpetual and the regulations were revised from time to time, either to bring them up to date, or to extend them. A final protocol, dated 1911, had effected a marked improvement in the previous regulations by authorising the introduction of an international type (*gabarit passe-partout*) and by approaching the solution of a technical problem, which is extremely important from an international point of view: that of the use of the continuous brake on goods trains.

Thus the almost unlimited exchange of rolling-stock belonging to the various administrations was made possible. It is generally known that the exchange of rolling-stock is a necessary condition for a through service *i.e.*, a service which, despite the existence of different managements, appears to the public to be operated exactly as though under the control of a single managing body.

Only Spain and Russia (partially) did not adhere to the Convention on standard-gauge lines (1 m. 435) ; they kept the broad gauge (1 m. 54) on their main lines. Further, in many countries narrow-gauge railways (1 m. and less) have been constructed on a large scale. But, if the narrow gauge is justified by the unimportance of the lines using it, a movement in favour of the abolition of the broad gauge is already apparent in the case of the main lines on which it had been adopted.

This principal technical agreement was followed by numerous subsidiary agreements ; it may also be added that the friendly diplomatic relations existing between the various countries had rendered the conclusion of agreements concerning international transport an extremely easy matter, and that instances of political and economic rivalry obstructing these schemes of public utility had been of relatively rare occurrence. With regard to passenger services, mention should also be made of the conferences on the subject of time-tables for the purpose of ensuring connections at the frontiers, and of the introduction of international trains made up alternatively, or without discrimination, of rolling-stock belonging to the railways concerned, which traversed several countries and enabled passengers to cover extremely long distances with the greatest speed and convenience, and at the lowest possible cost, without once changing carriages, and without delays for customs examinations — which were carried out in the carriages themselves. When, owing to the small amount of traffic, it was not expedient to form international trains, recourse was had to through carriages covering a previously determined route, which were shunted from one train to the other, thus making it necessary for passengers to change trains. The introduction of combined international tickets, of through tickets of connections, even when a sea-voyage intervened, completed the series of facilities in such a way that the international passenger traffic showed a marked and steady increase.

"Exchange Unions" had been set up for the transport of goods, which allowed the adhering States to use without discrimination rolling-stock corresponding to the uniform type, on condition, naturally, that the regulation concerning compensation for use was observed.

Further, convoyed train-services or series of trains run in connection with each other had been organised, which allowed the direct transport of perishable goods, consigned to distant destinations, without delay at the frontiers.

Together with the agreement for technical uniformity, mention should be made of the commercial agreement known as the "Berne International Convention on the Transport of Goods by Rail", concluded in 1886 at the invitation of Switzerland, and ratified on October 14th, 1890, as the result of a diplomatic arrangement between France, Germany, Austria-Hungary, Belgium, Italy, Luxemburg, the Netherlands and Switzerland. Special laws were passed in each of these countries to enforce observance of the Convention, to which Denmark, Bulgaria and Roumania later adhered.

This Convention was in reality a civil and commercial code governing international transportation from territory to territory which was carried out by means of through way-bills, valid for the contracting States ; it laid down rules for combined services, the form and legal consequences of the transportation contract, the responsibility of the shippers in case of damage, loss or delay, the exercise of the right of compensation between the railways participating in the transportation, the extinction or prescription of legal proceedings, and jurisdiction in claims. With regard to customs formalities, it was decided that they should be carried out by the railway administration at the frontier concerned, acting as customs officials, on the basis of the declarations made by the consigner.

Many States had not been content with making the Berne International Convention compulsory. They had also applied its provisions to home transport, with a view to obtaining, in this complicated question, such uniformity of law as would promote the development of trade.

The execution of the Convention was placed in the hands of an international office, which had its seat at Berne and was intended to serve as an information centre, and as an intermediary and arbitrator in cases of litigation between the adhering railway systems and to facilitate financial relations between the various States ; one of its special duties was to investigate requests for revision of the Convention, and to arrange for the meeting of further conferences. As a matter of fact, the original text was amended and completed by various instruments : the declaration of September 20th, 1893, the agreement of July 16th, 1895, the Convention of June 16th, 1898, and that of September 19th, 1906. The office publishes an official organ every month known as the *Bulletin des transports internationaux par chemins de fer.*

The transport of goods was greatly facilitated by the existence of through services, *i.e.*, of agreements between the various countries for the establishment of tariffs applicable to international transport of specified origin and destination. Merchants might thus easily learn in advance, without making complicated calculations, the total cost of transport, even if it involved many railways in various countries.

Identical principles relating to the application of uniform tariffs, which were in nearly every case modelled on the Berne Convention, had also been applied not only to railways, but to road, river and ocean transport. Thus there were direct services between the railways and the Swiss posts (postes) and between the railways and the Italian and Swiss lakes, the Danube, etc., and between the Continent and England, etc. Germany, Austria-Hungary and Italy in particular had developed the combined railway and waterways service to a remarkable extent by means of agreements concluded between the various railway administrations and shipping concerns. These agreements proved remarkably useful for the development of European exports to the African colonies, Asia Minor and South America.

In view of the services which had unquestionably been rendered by the Convention on the Transport of Goods, an attempt had been made to conclude a similar agreement relating to passengers and luggage. This agreement, while not as important as the above Convention, was none the less calculated to facilitate the relations between the various countries.

Switzerland, which is extremely interested in promoting passenger traffic, again took the initial steps in the matter.

A draft Convention, drawn up by the central office, was communicated to the Governments concerned and received their careful consideration. As a result, German, Austrian, Hungarian, Belgian, Danish, French, Italian, Luxemburg, Norwegian, Dutch, Roumanian, Russian, Swedish and Swiss delegates met at a conference at Berne in May 1911. Their discussions led to a final draft convention (May 30th, 1911) on the transport of passengers and luggage, with through tickets or through luggage checks, not only on railways but, should occasion arise, by other means of transport by road, river or ocean.

The application of this Convention was interrupted by the war.

It need scarcely be added that, prior to these international conventions, railway agreements of all kinds had been concluded between the railway authorities of a single State or of States having a community of interests, of language, etc. In this connection, mention should be made of the Union of the German Railway Administrations *(Verein deutscher Eisenbahnverwaltungen)* established in 1850, which had unified the technical regulations regarding the construction and operation, the conditions of transport and the general tariff system for nearly all the railways of Germany, Austria-Hungary, Roumania and the Netherlands, *i.e.*, 80 railways forming a system of approximately 100,000 km. Nevertheless, from an international point of view, this agreement was merely a semi-official understanding, as its rules only constituted a moral obligation on the railway authorities and were independent of any Government intervention.

Although this does not profess to be an exhaustive report on the measures taken to facilitate international railway traffic, it should be remembered that special institutions administered the debit and credit accounts between the various railway managements. Owing to the reciprocal use of the means of communication and the loan of rolling-stock, these accounts were of an extremely complicated nature. This inconvenience was, however, tolerated, in view of the great and mutual advantages in the development of transport. Special joint offices for liquidation and control were set apart for the administration of these accounts, as, for example, the Hanover office for transport relations between Germany and Austria-Hungary, and the Szégédin office for relations between Austria-Hungary and Roumania, that of Munich for transport between Austria-Hungary, Germany and Italy, and that of Strasburg for Franco-German and Italo-German through transport *via* the St. Gothard, etc.

There were organisations similar to the above for liquidating the charges for the use of rolling-stock between countries belonging to the same "Exchange Unions." Thus the International Exchange Union includes the greater part of the French, Belgian, Dutch, Luxemburg, Swiss, German, Austro-Hungarian and Roumanian railways and the Russian Vienna-Warsaw standard-gauge line; this union, which has its central office at Magdeburg, was responsible for the enforcement of the "Regulations for the use of rolling-stock by railways belonging to the International Union." "The Union between the railways of central Europe, on the one hand, and of Italy on the other" includes the Swiss, Austrian, Hungarian, German, Belgian, Dutch and Italian railways, and had offices at Strasburg and Magdeburg, where hire rates were liquidated in conformity with the "Regulations for the reciprocal use of rolling-stock, etc." Mention should also be made of the "Austro-Oriental Union" for the Austrian, Hungarian, Roumanian, Serbian, Bulgarian and Eastern Turkish railways, with offices at Budapest.

But this does not complete our survey. The prolonged peace had given rise to a belief in the stability of frontiers and had promoted the construction of plant to facilitate railway relations at the junction of the lines of one State with those of another in order that transport should be impeded as little as possible in crossing from one country to the other; thus, huge international stations had been erected which did not always correspond exactly to the frontiers, but which served as virtual customs and railway frontiers. They were furnished with all the equipment necessary for establishing communication between various railway administrations, but their operation was, as a rule, in the hands of a single administration which acted on behalf of the others.

Mention might also be made of railways crossing frontiers, constructed at the cost of several States. The obstacles arising from the complicated nature of the agreements involved were surmounted by the good will of the contracting countries.

Many engineering works bear witness to the effect of peace on the development of lines of communication; for example, the tunnels through the Alps, such as that of Mont Cenis, the cost of which was borne by Italy and France; the St. Gothard tunnel, for which Germany, Switzerland and Italy contributed, and the Simplon, which was the result of an agreement between Italy and Switzerland.

The Association of the International Congress of Railways, with offices at Brussels (now known as the International Association of Railways), has a membership of 254 railway companies, including those of the United States of America, and embraces a total system of approximately 300,000 km. Although very general in its aims, this association has contributed, indirectly doubtless, but appreciably, to technical unification. Germany only belonged to this association for the period 1905-1914.

Thus it may be said that before the war the railways had reached a state of development calculated to produce the most excellent results.

As a result of the war, this great system of agreements was swept away, and this largely accounts for the present crisis in international traffic.

The League of Nations has assumed the task of restoring pre-war conditions by means of already existing permanent organisations and general conferences between the States. It intends to improve them, when opportunity offers, by replacing the limited and fragmentary agreements by conventions, which will guarantee the observation of the fundamental provisions of the Covenant in an effective and permanent manner.

A final observation must be added to these general considerations. During the war, State railway operation was extended at the expense of private enterprise. The serious difficulties arising out of the war even led certain companies to give up the lines they held under concessions. Changes of regime hastened repurchase; the lines of conquered countries came into the hands of the new Governments. Apart from these facts, the war led to the concentration of management in the hands of a single directing body. In certain countries before the war the railways were operated by several companies.

We have not exact statistics at our disposal, but it may be asserted that at present there are few countries in Europe where private administration is clearly predominant. The only countries in this position are England, France and Spain. During the war, England and France centralised the railway service of the whole country to ensure unity of direction of all traffic, both military and civil. The satisfactory result of this unity of direction, from a technical point of view, gave rise to a movement in favour of general nationalisation of the railways in both countries, but experience has shown that State management is not conducive to economical working. For this reason, at the end of the war, the railways were restored to the companies and private operation resumed. It is not unlikely that similar considerations of economy will, in the future, induce the new States, which have enormous railway deficits, to adopt the same method when they reorganise their railways on a permanent basis.

2. *General Effects of the War on Communication by Rail.*

Tradition has it that war has a beneficial effect on means of communication.

The wars which led to the formation of the Roman Empire gave a considerable impetus to the construction of ordinary roads; shipping developed at the time of the Crusades; the incessant wars of the Napoleonic age were well calculated to promote the extension of communications; lastly, the wars waged in the course of the twentieth century furthered the extension and development of railways.

As regards the world war of 1914-1918, favourable effects of the progress of motor traction and aerial transport may also be noted; but, as far as can be seen at present, its effects were distinctly prejudicial to the railways.

This by no means contradicts the lessons of the past, which have just been mentioned. It is true that means of communication in their early stages of development can be improved by wars, of which they are an essential element; on the other hand, in the case of an organisation which is already highly developed and efficient, the ruthless necessities of military operations can only have a harmful effect, due especially to their disorganising elements.

It is quite possible that a few lengths of railway line were built here and there for exclusively military purposes, but this unimportant increase made no difference in the general state of development at which the railway systems had arrived in 1914. This development represented the sum of intensive building activities which had lasted, without interruption, for over three-quarters of a century. The military railways built in France by the Americans, those laid on the Russian frontiers by the Germans, and the connecting lines built by Italy on the Austrian frontier, together, make up a number of kilometres which would have seemed remarkable in the early stages of railway construction ; today they amount to a very small fraction of the lines laid in time of peace.

Thus, the useful effects are negligible ; the damage is very different in extent.

We already pointed out one of the regrettable consequences of the war when we noted the destruction of international organisations for increasing the efficiency of transport services by rendering them more rapid, certain and economical, and by freeing them from the obstacles raised by the existence of frontiers. These organisations will have to be entirely re-constituted. To this extremely serious harm must be added damage of a material nature. The chief item under this heading is the demolition carried out in the invaded areas.

The destruction of means of communication is a regrettable necessity in military operations and retreats ; but in the last war the extremely efficient technical preparations of certain of the belligerents enabled them to carry on a systematic work of destruction ; thus, the work of reconstruction has been rendered difficult, long, and costly. High explosives were used to tear up and destroy track ; all buildings and plant were razed to the ground ; not only were the arches and floors of bridges destroyed, but their piers and abutments were levelled to the very foundations ; even the permanent way was broken up ; locomotives and carriages were destroyed or carried off as booty. In those areas which were first invaded and then abandoned, it has been necessary to relay the lines completely ; as a rule this situation has been met by means of temporary works carried out with remarkable speed, and the final reconstruction, which will cover a fairly long period, has been postponed. In the meantime, railways in these areas will only be able to run limited services ; trains will have to be reduced in number and weight, and continue running at comparatively slow speeds.

To the systematic destruction carried out in the course of retreats — which was of an extremely serious nature — must be added the damage resulting from military operations strictly so-called. Artillery often selected as its objective railway junctions, large stations, bridges, and the openings of tunnels, in order to impede the movement of the enemy ; not only the occupied areas, but the areas adjacent to those where military operations were being carried on, suffered this damage, which was, however, far less than that caused by systematic destruction.

The damage caused by the war assumes extreme proportions in France, Belgium, Serbia, Hungary, Italy, Poland and the Baltic States, at any rate in areas which formed the theatre of military operations.

This direct material damage, although enormous, cannot be compared in gravity with the indirect damage, if the general effects of the war on the means of communication can be so called. Railways are a military instrument of prime importance. In the last war particularly, they were extended up to the very field of battle, and their usefulness was apparent in the whole of the vast sphere of strategy and tactics. They brought all that was necessary for hostilities right up to the front : men, munitions and supplies. They carried back to the rear men who were wounded, or who were taking their turn in rest billets, or proceeding on leave. In the rear they were necessary for supplying material to industries which were producing munitions of war ; they sustained the economic life of the country, and assured its food supplies. It was inevitable that in keeping up this gigantic and unceasing effort for so many years, the railways should deteriorate through the excessive overtaxing of all their resources, and especially of their rolling-stock, the present shortage of which is one of the best-known and most striking features of the critical post-war situation.

The wear and tear of railway-stock must be attributed not so much to the intense use of it during the war (on certain systems the information available shows that war traffic exceeded peace traffic by 50 to 100 per cent.) as to the inability to carry out repairs. As the rolling-stock had been concentrated in the zone of operations, it was far distant from its usual place of assembly, where the workshops were situated. The latter, moreover, had been deprived of their oldest and most experienced workmen, who had been called to the colours ; they could not, therefore, carry out their normal work at a time when they should have been prepared to cope with an entirely exceptional situation.

Special mention should be made of the fact that, owing to the shortage of coal, engines were run on all sorts of fuel of inferior quality, and, as necessity arose, given to untrained drivers who had not completed the requisite period of apprenticeship.

Although the effects of the war are most evident in rolling-stock, it is none the less true that the equipment and plant also suffered from the abnormal conditions created by the war, if only in the matter of upkeep. The statements show clearly that, on certain lines, the speed of trains had to be reduced, because it was impossible to replace worn-out wooden sleepers. Further, in normal times, railway equipment is constantly being improved and augmented, and so enabled to meet the varying and growing requirements of transport ; as may be readily imagined, such improvements and additions were completely neglected during the war.

Without dwelling on this aspect of war damage, which it is easy to appreciate, we shall mention other causes of deterioration of a less obvious nature. Further, we shall have occasion to note that, while strictly material damages, such as the decrease in engines and carriages, the lack of repairs to plant, and others of a similar nature, may be made good at a more or less considerable financial sacrifice, this does not apply to the change in the direction of the currents of traffic, which is intimately connected with the political consequences of the war.

By altering the frontiers, the formation of new States gave rise to new situations even as regards the railways. The great changes in frontiers have rendered international stations (frontier stations) useless, and have made it necessary to build new ones.

Now, as we have already had occasion to point out, international stations are complicated organisations, which generally require a long period of years for their complete development, for they must be provided not only with purely railway equipment, but also with accommodation for customs, for health inspection, for postal services and police, and must be subject to appropriate regulations. Thus, the abandonment of already existing international stations and the building of new ones forms a very heavy item of expenditure. In addition to this, the choice of the site of frontier stations requires lengthy negotiations between the countries concerned. A point actually situated on the frontier is seldom suitable for the erection of large buildings (the case of the Brenner Station, a small Alpine refuge on the new frontier between Austria and Italy, is a typical example). Thus a site has to be selected which is on one or other of the two territories, the political rivalries and complications which are inevitably brought into play in such a choice must be smoothed away, and complicated agreements for the mutual operation of the station, not only as regards railway administration but also in the matter of customs, postal service and police supervision, must be concluded. This involves considerable expenditure, which has to be divided between the countries concerned (and this division is in itself a difficulty) at the cost of much time and labour. Meantime all operations on the frontier are held up and international traffic seriously obstructed.

The number of international stations to be transferred is large. It will be sufficient if we mention that for Austria alone new agreements will have to be made for at least 15 stations of this type ; Hungary, which formerly required 14 international stations equipped with all the requisite buildings for its traffic, now has to employ 46, which lack the necessary plant, and the majority of which are not suited for the work imposed on them. Czecho-Slovakia requires 30 new international stations for its traffic with Austria and Hungary. It is, however, not necessary to add these figures together, as each State considers that the joint stations should belong to it ; but in any case there is extremely urgent work to be carried out, and no funds to do it with.

The greater railways had followed routes which corresponded to the economic policy of the countries they traversed rather than to local topographical and geographical conditions. Technical progress and the possibility of drawing on unlimited financial resources made it unnecessary to restrict the choice of routes. Thus it became a simple matter to transform these lines into a political instrument of prime importance by creating distinct currents of transport, even if this operation revealed the influence of considerations alien to natural economic conditions. The destruction of certain political organisations and the creation of others inevitably diverted the currents of traffic from their original channels. Thus the existing railways were likely to find themselves in the position of rivers suddenly deprived of the streams which feed them, while great masses of travellers and merchandise blocked lines which were not prepared to carry them. The most characteristic manifestation of this phenomenon was in the part of Central Europe which had long been under the domination of the Austro-Hungarian Empire.

Austria's railway policy, as also that of Hungary, had a two-fold object : it attempted to consolidate the economic unity of the political aggregate by establishing commercial solidarity where national solidarity was lacking, and it aimed at keeping in a State of subjection countries which found the imperial yoke irksome and would easily have thrown it off had they been economically developed.

The criticism levelled at the Austrian railway system is that it gave almost exclusive preference to lines running from north to south, which fell in with the plan to foster relations between the regions of Bohemia, Moravia, Silesia and Galicia, rich in mining and agricultural products, with the almost completely non-productive Alpine districts. This arrangement did not allow all the districts of the empire to participate equally in national and international traffic.

Moreover, it should be pointed out that all the lines converged on the two capitals, so that traffic from the north through German ports, and from the south *via* Trieste, the sole maritime outlet of the Monarchy, always moved towards Vienna and Budapest, more especially Vienna, which had become one of the most notable centres of European commerce. But although this state of affairs might profit Vienna and Austria proper, it did harm to the other regions which, despite their long political connection, had preserved autonomous tendencies which were based on their very ethnic character and for that reason ineradicable.

Through communications from east to west were rare ; it is true that this is the direction of the great Danube waterway, but the requirements of modern transport are such that they can only be partially met by the use of waterways. Further, this means of communication did not exist in the northern countries of the Empire. It may thus be said that no attention was paid to the movement of transport from the countries of Western Europe to Russia or the Balkans.

The chief Austrian railways, although admirably planned to meet the requirements of an economic territory which had been created artificially and maintained by railway or customs facilities, have now lost their value by being cut up and incorporated in States with divergent aims.

Of the two main arteries running north, the Trieste-Vienna-Oderburg line includes an Italian section, a Serb-Croat-Slovene section, an Austrian section, a Czecho-Slovak section and a Polish section ; and the Verona-Ala-Kufstein line is divided into two sections of different nationality, with an altered frontier passing through a most unsuitable region, as was mentioned above. This also applies to the Marbourg-Franzenfeste line, used for transport between Hungary and the Balkans on the one hand and Southern Austria and Switzerland on the other, and now divided between three countries.

But as we have stated above, while Austria had devoted all her attention to lines running south or north from Vienna, the new States, which lie chiefly from east to west, prefer lines running in that direction. It remains to be seen if and to what extent these tendencies correspond with natural conditions, which are really favourable to lines running from north to south, as these connect countries which differ in climate and production ; but there can be no doubt that, pending new organisation, the overthrow of the former organisation has increased the difficulties of trade. It is clear that it will require the consistent effort of many years to adapt the European railway system to the new political formations, especially as the work of reconstruction will of necessity be extremely slow. It is true that the newly formed States have many plans for building new railways to meet the requirements of the national policy adopted by each of these States, but the lack of financial resources, the scarcity of labour and the extremely high prices of all building materials will prevent the speedy realisation of these plans. We must, therefore, count on the effect of measures taken to utilise existing lines and plant in spite of difficulties, rather than on solutions which involve the complete construction of costly lines.

This disorganisation of transport is an extremely serious matter, and it is further aggravated by the exchange situation. If the differences in the exchanges are disastrous their fluctuations are even more so. The fluctuations deprive the railway tariffs of that stability which was their main advantage and which enabled the cost of transport to be previously calculated almost to a farthing, without fear of surprises. Such calculation is at present impossible. Whereas the pre-war organisation had almost entirely done away with middlemen and forwarding agents, these have now reappeared in great numbers ; they increase the transport charges by the cost of their services.

The abnormal condition of the exchanges also renders co-operation between the railway administrations of the various States a matter of difficulty. They can lay down no single rate, for serious differences in values are likely to occur. As no solution of the problem of the exchanges has yet been discovered, it is reasonable to think that, in this connection also, there will for a long time be great difficulty in restoring pre-war conditions in international relations.

We have thus, in our rapid review, brought out the main features of the results of the war on routes and transport. We shall now dwell on the various matters referred to in the questionnaire, and we propose to ascertain the more important general conclusions which may be drawn from the replies of the various States.

3. *Development and Situation of existing Lines.—Improvements and Extensions. — New Lines in Contemplation.*

All countries, although confronted by serious difficulties of every kind, have made vigorous efforts to repair their lines. They have pushed on the repair work, which was neglected during the war, and have relaid the lines destroyed in the invaded districts. The reports show that this work of restoration has made remarkable progress. It may now be stated that all the lines existing before the war, together with the lines laid during the war, are once more open for traffic, subject to minor restrictions.

Naturally the situation differs in different countries. In Western Europe the reconstruction of the lines has made rapid progress, for the greater industrial development of these countries has provided them with ample resources. Moreover, the organisation of the States in this part of Europe underwent no important modification. The previous system of railway administration, which remained intact, was able, with comparative ease, to deal with the serious task now imposed upon it. Among the countries of Central Europe, only Italy and Czecho-Slovakia had to repair direct damage ; they are proceeding rapidly with this work under the same favourable conditions as prevail in the western countries. But the work of reconstruction is making slower progress in the countries of Eastern Europe, where the creation of new States destroyed a previous railway organisation which was still far from being perfect.

During the period immediately preceding the war the increase in the extent of the European railways amounted to a yearly average of about 1 to 2 %, but the increase varied considerably in different countries. Certain regions could be regarded as saturated with means of communication. This was the case, for example, with a great part of Western and Central Europe. Other regions, again, such as the Balkan countries (Serbia, Roumania, and in particular Bulgaria), were in the full ardour of their first railway development. It was natural that the war should put a stop to all construction for lines of a purely military character.

However, during the war, especially in countries which remained neutral, some lines which had already been begun were opened for raffic.

This was the case in Switzerland with the Frutigen-Brigue line (60 km.), the Jura line, between Moutier and Longeau (13 km.), the Sissach-Olten line (17 km.), the Brigue-Gletsch section (47 km.) of the Furka railway, the eastern section of which (Gletsch-Disentis), extending to the Rhone valley, has had to be postponed. All these lines are of international importance. At the time the Swiss statement was drawn up the second Simplon tunnel (20 km.) was being constructed. It has just been completed as we write. The Locarno-Camedo-Domodossola connection, a further link between the Swiss and Italian railways, is also under construction.

During the war Spain also extended her railway system. Several lines (Irun-Madrid, Barcelona-Gerona, Valencia-Jatiba) have been double-tracked. The Canfranc and Puigcerda lines are nearly completed. Plans for a line from Caminreal to Carinena have been approved ; this line will enable direct relations to be established from south to north between Valencia and France, *via* Canfranc ; the same is true of the projected line from Zamora to Orense, which is intended to give a speedier service between Madrid and Vigo.

The through Madrid-Valencia line has reached the stage of an approved scheme. The Noguera-Mallaresa and Ferrol-Gijon lines, which complete the line along the Cantabrian coast, are under construction. The international line crossing the whole of Spain from Alduides (Pyrenees) to Algeciras, *via* Madrid, is under consideration.

Sweden, Norway, Denmark and the Netherlands also took no part in the war. They call for no special remark. The same may be said of Luxemburg.

In Sweden, a country well supplied with railways in proportion to the population, the lines were maintained in good condition during the war, and a beginning was made with the laying of certain new lines (Ostersund-Gallevare, Forsmo-Hoting, Hallnas-Stensele, and the Sveg-Brunflo line, which is specially important, as it is to ensure communication between Western and Northern Sweden).

In Norway a line from Storen, on the Christiania-Trondhjem line to Dombaas, constituting a through route between Christiania and Trondhjem, *via* Hamar-Dombaas-Storen, will shortly be opened for traffic. Other narrow-gauge lines have been converted to standard gauge.

If we now turn to countries belonging to the Western European group which took part in the war, we observe that the English report makes no special reference to the condition of existing lines and plans for the laying of new lines. This circumstance is quite natural, for the United Kingdom was not the theatre of land operations, and in this connection everything proceeded in that country as in time of peace. The railways, moreover, are so highly developed there that no need for any considerable extension is felt.

The French report supplies us with no information as to the extent to which the railways were destroyed during the German occupation. We gather, however, from Parliamentary papers (Report of the Minister Claveille, dated March 13th, 1919, to the President of the Republic) that the actual length of track destroyed or damaged was 5,600 kilometres out of a total of 54,000 kilometres of line. 1,510 bridges, 12 tunnels, 590 buildings and 500 watertanks were destroyed or damaged. The construction and repair workshops at Hellemes, near Lille, were stripped of their machinery and equipment. The workshops at Tergnier, Lens, Amiens, Epernay, Roy and Mohon were rendered unserviceable, permanently or for a long period. All locomotive depôts in the zone occupied by the enemy were completely or partially destroyed, but the work of reconstruction has been pushed on with great rapidity. According to another report of M. Claveille, on July 1st, 1919, only a few kilometres of line had still to be completed. 1,650 kilometres of new line, 1,612 of which are standard gauge, were laid in France during the war, in addition to the work done on stations and engineering constructions.

As we have already pointed out, ambitious programmes for new construction have been considered in many countries, particularly in States recently created, or which have increased their territories as a result of the war.

France is putting forward proposals for new construction on a large scale. In that country the lines are divided into four classes: railways under construction, which are certain to be completed at an early date (1,567 kilometres); railways for which concessions have been granted to companies or which have been declared public utilities, but on which work has not yet begun (598 kilometres) ; lines for which concessions have been granted to companies but which have not yet been declared public utilities (693 kilometres) ; projected lines favourably considered by the authorities. To form an idea of the extent of this programme, it is important to remember that its completion will involve a total expenditure of about 7 milliards of francs—an expenditure which, according to the estimates, will require to be spread over fifteen years, representing an amount of 450 millions yearly.

Among the most important lines in contemplation, we may mention the two lines crossing the Vosges from Saint-Maurice to Weserling, and from Saint-Dié to Saeles, which are intended to link up Epinal with Mulhausen and Strasburg ; the Lérouville-Thiancourt line, which will place Metz in direct communication with Bar-le-Duc ; and the Pont-Saint-Vincent-Blainville line, which will connect Toul to Blainville without the roundabout journey *via* Frouard and Nancy. All these lines are intended to improve communications with Alsace, which has been restored to the mother-country.

Moreover, in view of the special importance of the Bordeaux-Odessa route, along the 45th parallel, which is intended to ensure communication, without crossing the territories of Germany and Austria, between the Atlantic, France, Italy, the Serb-Croat-Slovene State and Roumania, with branch lines to Athens and Constantinople, a scheme has been set on foot for a Limoges-Saint-Germain-les-Fossés line to improve the service between Bordeaux and Lyons, and a Saint-Germain-les-Fossés-Paray-le-Monial line, which will provide better communication between Bordeaux and Mulhausen.

Mention may also be made of the line from Rouen to Havre, another crossing the Seine, intended to link up Havre with the the west, and the line from Nantes to Paimbœuf.

The Channel Tunnel must be included among important engineering works under consideration.

During the war, 1,100 kilometres of railway were completely destroyed, and 400 kilometres partially destroyed, in Belgium, not to mention 1,400 large and small engineering works, which must be rebuilt. The work of reconstruction was rapidly carried out, and on July 1st, 1920, the service was again in full working order, although, in addition to the relaying of the permanent way, it had been necessary to reopen 593 stations and halts which had not been used during the war, to make alterations in the main depôts, to remove 30,000 trucks loaded with ammunition, war material and booty which had been placed on the track for the purpose of impeding the resumption of the service, and to provide for the organisation of a temporary signalling system and the supply of plant for the workshops.

A few new lines were laid while this work was going on, and other lines were double-tracked.

The work which it is proposed to carry out includes the double-tracking of certain lines, while others are to be quadrupled.

In Central Europe, the railway system of Germany, as a result of territorial losses, has been reduced by 6,850 kilometres. Of this total 2,031 kilometres are represented by the Alsace-Lorraine system, and the remainder by lines ceded to various States (Memel territory 137 km., Czecho-Slovakia 31 km., Belgium 153 km., Denmark 247 km., Poland 4,105 km., Free City of Danzig 146 km.—4,879 km. in all). No new undertakings are in contemplation. During the war, 1,223 kilometres of line were laid.

Owing to territorial losses, Austria at present owns only 6,626 kilometres of line. Only a few lines were directly affected by military operations, but the whole system is in a bad state of repair. Everything necessary has, however, been done to render the lines capable of meeting the requirements of traffic, though the work of repair was difficult owing to the fact that practically all the lines are mountain railways. Such repairs as were not absolutely essential for safety and all work for the purpose of increasing the capacity of the lines have naturally been postponed. It will be necessary to undertake a great deal of new work such as the building of frontier stations and the adaptation of the system to the new routes which traffic will take ; but so far no definite schemes have been prepared. The new constructions under consideration have had to be postponed, and in view of the unsatisfactory position of Austrian finances it is impossible to say when they will be resumed.

Hungary, which, before the war, had a railway system of 19,600 kilometres, possesses at present only 7,052 kilometres of line as a result of the loss of part of her territory.

The work necessary to maintain the lines in good condition is in arrears, and in view of internal political difficulties it has not been possible to draw up a programme of new construction.

Czecho-Slovakia is one of the new States where the previously existing railways completely fail to meet the requirements of traffic. This country, which consists of Bohemia, Moravia, and Silesia in the west, and of Slovakia and Sub-Carpathian Russia in the east, is in the form of a trapezium elongated towards the east and west, and is provided with lines running from north to south, whereas it is of the utmost importance that it should own lines running from west to east, parallel to the longitudinal axis of the republic.

As regards international communication, Czecho-Slovakia would, for the reason previously mentioned, favour the opening of the Bordeaux-Paris-Prague-Warsaw and Prague-Bucharest-Black Sea routes.

In this country, as is the case in other new States which have been formed out of territories of previously existing States, a certain lack of uniformity in technical matters relating to railways may still be observed. For example, there are still main lines with heavy rails which are consequently suitable for heavy rolling-stock and express trains, and other lines on which only rolling stock of limited weight can be run and where it is necessary to reduce speed.

Czecho-Slovakia suffered seriously from the Bolshevik-Magyar invasion in the south-east of Slovakia, but, as has been pointed out, the damage was promptly repaired.

The National Assembly has already adopted a programme for reconstruction work and improvements on the railway system, the completion of which will cost 6 ½ milliards of crowns. The plan is to construct 15 new lines of a total length of 558 kilometres and to double-track numerous existing lines.

The result of this scheme would be to open direct communications between the west and the east of the Republic by means of a new line passing though the centre of Slovakia, and it would adapt the system to the new routes and new economic requirements of the country.

In Italy the exigencies of the war led to the expenditure of much labour on existing lines and stations. Moreover, during the war the Montebelluna-Susegana line and the branch from that line to the Castelfranco-Montebelluna line were built. In addition, 150 kilometres of double track were laid. Signalling appliances were improved and increased.

The Italian railway system has had an addition of 1,027 kilometres, representing the lines in the Trentino and Julian-Venetia.

The damage done during the invasion has been completely made good.

The scheme for new lines includes the laying of about 800 kilometres of standard gauge, not to mention the numerous narrow-gauge railways now under construction in the south of the peninsula and in Sicily.

If we turn to Eastern Europe, we cannot fail to be impressed by the exceptional gravity of the railway situation in Poland. Throughout the whole territory of former Russian Poland the length of rail, in proportion to the area of the country, was far below what was necessary to meet the most elementary economic requirements. During the war the entire system was several times destroyed. The same remarks apply to former Austrian Poland ; there also the railways, already inadequate, were damaged during the war. The Bolshevik invasions completed the work of destruction.

A typical case is that of the Warsaw-Grodno-Vilna line, one of the principal lines in the country. As it was impossible to repair the viaduct over the Niemen valley near Grodno, which had been twice destroyed, this line was not used for a long time.

Further, the Polish system suffers from a radical defect in that the Russian Government, on strategical grounds, always opposed the linking-up of its system with the German and Austrian systems ; with only a few exceptions the lines of former Russian Poland stop short at points ten or more kilometres from the old frontier. Connecting lines have therefore to be laid, and, further, some 700 kilometres of the broader Russian gauge must be converted to standard gauge to make possible the interchange of rolling-stock with the railways of the rest of Europe.

The railways in Roumania were seriously damaged by aeroplane and Zeppelin bombardments. Moreover, when the national and the Russian armies retired, many railway engineering works were destroyed at the request of the Allied Powers. Further havoc was wrought during the invasions and during the occupation, which lasted more than two years. On his retreat the enemy completed the work of ruin by utterly destroying not only engineering works and buildings but even stock of every description, furniture, archives, etc. Arrangements have been made to reconstruct the system provisionally, for considerable time and an outlay estimated at three or four milliard gold lei at least will be required for its final reconstruction.

Roumania, by annexing Bessarabia, Bukovina and Transylvania, now owns the railways in these territories, but large portions of these railways, and especially of those in Bessarabia and Bukovina, were destroyed during hostilities, and are in need of extensive repairs.

Roumania in her report makes no mention of any plans for new construction.

The railways of Bulgaria, which was continuously at war for many years, with a single respite in 1912, are in bad condition, and it is as much as she can do to maintain a service of trains running at reduced speed (30 km. per hour).

It is still too soon to think of laying new lines, apart from a few narrow-gauge lines of purely local interest, and the Mzdra-Vidin standard-gauge line, which is already in operation as far as the Alexandrovo bridge, and of which a section, 30 km. in length, has still to be laid to Vidin, the work having been interrupted by the war.

At the close of the great war, Greece owned 1,149 km. of standard-gauge lines and 1,246 km. of narrow gauge lines. By the occupation of Thrace and the signature of the Treaty of Sèvres, 597 km. of standard-gauge track passed into the hands of the Greeks. The standard-gauge system has thus a length of 1,746 km., and the total length of line amounts to 2,992 km., 1,319 of which are standard-gauge and 865 narrow-gauge. 72 % of the total is operated by the State.

The Greek programme for new construction is on a fairly large scale and includes a Drama-Cavalla line in Macedonia (34 km.), a Salonica-Angistra line, also in Macedonia (134 km.), a Klabaka-Janina line (105 km.), a line from the Piræus to Janina and Valina (391 km.), and from Acheloos to Janina (227 km.), all standard-gauge lines, and, in addition, a number of narrow-gauge lines.

The Kingdom of the Serbs, Croats and Slovenes is described in its report as essentially a country for through traffic. Some of the great highways of international trade, both between the north and south and the east and west, will doubtless pass through its territory. There is a marked contrast between these aspirations and the actual inadequacy of the railways, which is to be ascribed, as has already been shown, to the fact that the Austro-Hungarian Empire aimed at making all railway lines run to Vienna and Budapest and at keeping the Serb, Croat and Slovene territories under its sway, without means of communication.

Austria's efforts were specially directed to keeping Serbia in a state of complete political isolation, and the latter, owing to her lack of capital and the special difficulties which the nature of the country places in the way of making new roads, was unable to escape from this isolation by her unaided resources.

The first railway in Serbia—that from Belgrade to Nish, about 250 km. in length—was opened for traffic in 1884, and this line, with an extension to Salonica and a branch to Constantinople, is the main artery of the country.

In the Serb-Croat-Slovene Kingdom there are 8,955 km. of lines, but as these lines are not linked up with each other, it may be said that, though the new State is not without railways, it has not as yet any railway system strictly so-called.

The Belgrade-Nish-Salonica railway, which follows the Valley of Morava and then that of the Vardar and is not crossed by any line which might relieve it of part of its traffic, assumed exceptional strategical importance. For this reason it was used during the Austro-Hungarian, German and Bulgarian invasions and at the time of the final retreat it was systematically destroyed. A great deal of time will be required to reconstruct this line ; in the meantime it has been temporarily restored sufficiently to enable a train service at reduced speed (25 km. per hour).

The new undertakings which it is proposed to carry out, in addition to the complete reconstruction of the lines which were destroyed, must therefore aim at creating a real railway system in the Serb-Croat-Slovene Kingdom which will meet the actual needs of the country and serve to connect it with its allies. The railways which, according to the report, must be reconstructed to achieve this object are :

(1) The " Adriatic line ", from San Giovanni di Medina to Scutari, Nish, Prahovo and thence to Bukarest and Odessa, an earlier scheme, the most important section of which—that from Nish to Prahovo—had been completed as early as 1914.

(2) The lines forming part of the Atlantic-Black Sea route along the right bank of the Danube from Belgrade to Pozarevatz-Brza-Palanka (Serb-Bulgarian frontier), crossing the Danube at the latter station to connect with the Cracow-Bukarest-Odessa line.

(3) The Belgrade-Serajevo-Adriatic line (Neum Klek or Spalato).

For the purposes of this investigation we may include among new States the Baltic countries, omitting, however, Finland, whose report records no special change during the war, at least as regards communications and transport by rail. On the other hand, the reports dealing with Lithuania, Latvia and Esthonia are full of interesting details.

Lithuania, which has an area of about 85,000 sq. kms. (three times that of Belgium) and a population of 4,500,000, has 1,920 kms. of standard-gauge railway (299 of which were laid during the German occupation) and 1,200 kms. of narrow-gauge lines, part of which are not at present in operation. Some of these, such as the Kovno-Vilna line, which is a section of the Berlin-Petrograd line, the Vilna-Dvinsk line on the Vienna-Petrograd route, etc., are international lines.

During the battles between the Russian and German armies during the Great War and the retreat of the Polish troops after their last engagement with the Russian army, 30 % of the stations were destroyed. Such stations as were not destroyed are in need of repair ; the bridges are temporary wooden structures, and are being rebuilt.

The plans for the future include, in addition to the work of reconstruction which we have mentioned above, the laying of new lines, among which may be mentioned the Memel-Telsiai-Chavli and the Kovno-Polonga standard-gauge lines, and 400 kms. of narrow-gauge line, and at the same time the removal of lines which, laid for strategical purposes, are no longer of any economic importance.

As regards Latvia, the railway system there consists of 1,876 kms. of broad-gauge line (1,136 of which are Russian gauge) and 973 kms. of narrow-gauge lines of different dimensions.

The engineering works and buildings were largely destroyed during the war, so that the reconstruction of the system will entail heavy expenditure.

Plans for the future include the laying of new narrow-gauge lines.

Esthonia possesses 991 kms. of railway, 651 of which are Russian gauge (1 metre 524) and 340 are narrow gauge (0.75 metres). On these lines there are numerous bridges which were to a great extent destroyed during the war, including the bridge over the Narev, 141 metres in length.

New lines are at present being considered, such as, for example, a through line from Reval to Moscow, the concession for which has been granted to Esthonia under the Moscow Treaty, and another which, running from the extreme west of the Island of Oesel, will connect the towns of Pernau, Wiljandi and Tartu and have its terminus at Smolensk, and will thus form the most direct link between the Baltic on the one hand and the South of Russia, the Donetz Basin and the Caucasus on the other.

The new State is counting on the assistance of foreign capital for the construction of these lines.

Attention must be called to the fact that the shortage of coal experienced during the war gave a great impetus to the enquiry in many countries into the application of electric traction to railways.

France drew up a scheme to electrify 8,893 kms. of main line, the necessary power being derived from the Upper Dordogne and the Rhone.

In Spain the electrification of the Col de Pajeras line, which connects the Asturian system with the lines in the interior, will shortly be commenced.

In her report, Sweden supplies no information on this subject, although she has developed electric traction on her railways to a remarkable extent.

In Switzerland considerable progress has already been made in carrying out the plans for the gradual electrification of the whole system of the federal railways—*i.e.*, 2,881 km. of line. The necessary work has been completed and electric traction is employed on a section of the St. Gothard line, 91 km. in length, and on the Bern-Thun (32 km.), and Brigue-Sion (55 km.) lines. The development of the necessary hydraulic and electric power is a very heavy burden on the federal railways. The cost of installing the two central power-stations on the St. Gothard line is estimated at 50 million francs ; the estimates for the Barberina power-station in Valais amounts to 37 million francs. At the end of 1920 the expenditure on power-stations, conduits and rolling-stock had already amounted to 146 millions ; a further sum of 52 million was included in the 1921 budget.

Austria has also prepared electrification schemes. As a result of the new frontiers determined by the Treaty of St. Germain, the Austrian Republic has been deprived of rich coal-producing districts, so that she is now dependent on Germany for this form of fuel. The desire to find a remedy for the very serious situation prevailing in the new State in this respect has led it to consider the question of substituting electric traction for steam traction by utilising the water-power of the country.

The Arlberg line was the first chosen for conversion ; the electrification of the Innsbruck-Salzburg line, the Schwarzach-Saint-Veit-Spittal-Lake Millstatt section of the Tauern line, and others, will follow shortly.

Italy, it may be said, occupies the leading position in the electrification of railways ; as early as June 30th, 1914, electric traction was employed on 300 km. of line ; on June 30th, 1920, this number had increased to 460. work was in progress on 200 km., and the complete plans provide fort he conversion of at least 6,000 km. of main line.

Latvia has also drawn up a scheme for electrifying her railways by employing the very considerable water-power at her disposal. The Dangava can supply 396,000 h.p. ; at Dole, near Riga, there is another fall of 65,000 h.p. and others again are found at Kegum, 85,000 h.p. ; at Ailazande, 36,000 h.p. ; Koknije 120,000 h.p. ; Aivnaja, 72,000 h.p. ; and Jebrabmeets 18,000 h.p.

But if electric traction is regarded by countries ill provided with coal as a remedy for the difficulties experienced in securing supplies of fuel, its technical advantages induce even countries which have coal at their disposal to adopt it. Such is the case, for example, in Great Britain. The English Minister of Transport intends, it is said, to encourage railway companies to employ part of their capital in electrifying their lines, particularly suburban lines. As experience has shown in a large number of countries, these lines may easily be electrified : traffic increases, and the capital thus invested brings in ample return. A commission of engineers is to investigate the means of solving the group of questions relating to the development of electric traction, especially from a point of view of the transfer of stock from one system to another and the employment of the same stock on different lines.

It is even believed that the electrification of railways will assist in solving the problem of removing the working population from the great congested urban centres.

4. *Rolling-Stock.—Traffic.—Rates.—Fuel.—Financial position of the systems.*

As regards rolling-stock, we have already seen that in all belligerent countries traffic suffered from the excessive demands on the available means of transport. It will be well to call attention to a few special points.

Germany, owning an abundant supply of rolling-stock in excellent condition, was compelled, on account of the wide area over which hostilities were waged, to subject her stock to very heavy strain, while she had neither the time nor the means to undertake any but the most urgent repairs. The blockade imposed by the Allies deprived her of the most essential raw material, so that she was compelled to use spare parts manufactured out of other material (iron boilers and fire boxes, metal chairs and insulators of poor quality). The use of this inferior material increased the repairs required. The locomotives had necessarily to use fuel of poor quality and deteriorated rapidly.

While repairs became more numerous and urgent, the output of the workers declined, especially in the case of factory hands. The German report lays special emphasis on this circumstance, which was common to all countries, and which is ascribed to the introduction of the eight-hour day, to the abolition of piece-work, to the employment of inexperienced mechanics and workmen to take the place of the experienced staff which had been called to the colours, and to the lack of foremen and consequently of supervision.

Political troubles, constant strikes and, in the case of Germany, the shortage of food during and immediately after the war, still further reduced the output of the workers.

Germany, however, points out that, as a result of the energetic action taken, the situation has improved and that last year piece-work was re-introduced.

It is difficult to estimate in figures the difficulty caused by the absence of stock sent to the repair shops. But certainly the percentage of rolling-stock thus immobilised is greater now than before the war.

According to the Italian report, the percentage of temporarily unserviceable stock had increased, on June 30th, 1920, as compared with June 30th, 1914, by 11.3 % for locomotives, by 7.4 % for passenger coaches, by 2.7 % for luggage vans, and 5.6 % for trucks.

In Czecho-Slovakia, while before the war the locomotives laid up for repairs represented only 18 % of the total, they amounted at the time of the Armistice to 40 % ; these figures then fell to 37 % in 1919 and to 32 % in 1920. Passenger coaches undergoing repairs amounted to 33 % of the total stock at the beginning of 1919, to 14.4 % at the beginning of 1920 ; trucks requiring repair represented at the two periods mentioned 14 % and 7.8 % respectively.

In Hungary the percentage of locomotives laid up for repairs was 62 % in November 1920, and fell to 45 % in 1921 ; the percentage of passenger-coaches undergoing repairs was 26 % in 1920 and 27 % in 1921, though general conditions had everywhere slightly improved ; the percentage of trucks under repair fell from 27 % in 1920 to 17 % in 1921.

The percentage of locomotives thus immobilised is greater than that of other rolling-stock. This fact can easily be understood, as locomotives require greater care than ordinary rolling-stock to keep them in good working condition.

Switzerland, on the other hand, is in a special position. The falling-off in traffic has left her with a surplus of locomotives and passenger carriages, and she has been able to lease a certain number of locomotives to foreign railways. The number of trucks, however, is now inadequate, because in consequence of the scarcity of rolling-stock on foreign systems, the large quantities of goods imported into Switzerland through the Mediterranean seaports have had for a long time to be carried exclusively on Swiss trucks. It therefore became urgently necessary to increase the number of Swiss goods trucks. The number of these trucks rose from 19,300 in 1913 to 25,000 in 1920.

Poland, Czecho-Slovakia, the Serb-Croat-Slovene State, succession States of the Austro-Hungarian Monarchy, together with the Austrian and Hungarian Republics themselves, lay special stress, in addition to the other difficulties which are common to all countries, on the inconvenience which they experience from the fact that the allocation of the rolling-stock which formerly belonged to the Austrian and Hungarian railways has not yet been carried out. (This allocation is to be effected by a special commission set up under Article 318 of the Treaty of St. Germain.) For this reason the countries referred to do not yet possess any rolling-stock which may be properly called their own, except such stock as they have built or acquired since the war. They have only a common pool of stock. which is very small in comparison with its previous dimensions. The locomotives and trucks sent into the zone of hostilities fell into the hands of the enemy, and in addition some of the trucks belonging to the common pool are immobilised in the country which temporarily holds them, and which is careful not to allow them to pass over its frontiers. The country which has suffered most from these circumstances is Czecho-Slovakia, which, as, above all, an exporting state, sends beyond her frontiers more trucks than she receives in return and only recovers empty trucks very slowly.

The pool of trucks should, according to the Czecho-Slovakian report, remain at the disposal of all the succession States : and, indeed, each of these States, being in urgent need, has come to regard the stock in its territory as belonging to it or at least as intended in the first place to serve its own industry. Thus, as difficulties are placed in the way of returning empty trucks, exporting countries state that they are in an intolerable position ; on the one hand they are compelled to send their trucks over the frontier to avoid unemployment in their industries, and on the other hand they find their home traffic placed in jeopardy by the steady disappearance of trucks from their territory.

The prevailing uncertainty as to the ownership of stock leads, further, to neglect in its upkeep. Many trucks in need of repair obstruct the lines and remain unused. It is absolutely necessary not only to expedite the allocation, but to return to the former strict system of exchanging stock so that it will be easier to use it in common. The stock indeed is not insufficient in quantity, but it is somewhat worn out. This comparative shortage is the main cause of the transport crisis from which Central Europe is suffering.

Czecho-Slovakia has a fair number of large workshops ; she intends to build others, and will thus soon be in a position to deal with the situation. The Serb-Croat-Slovene report states that the amount of rolling-stock belonging to the country is unknown, but the quantity is certainly not great and the stock is in very bad condition. Moreover, as there are no workshops for the repair of carriages in the national territory, the Serb-Croat-Slovene State is compelled to have recourse to neighbouring countries, which only carry out the orders after long delay and on very burdensome conditions.

Even the countries where railways are most highly developed and which suffered least from the war are experiencing the difficulties which arise from scarcity of rolling-stock. On June 30th, 1919, England had on her 16 principal railways 17,743 locomotives, or 1,186 fewer than at the end of 1913. These 16 railways had 650,606 carriages actually running on June 30th, 1919; that is, 45,315 fewer than on December 31st, 1913. This notable falling-off in the rolling-stock coincided with an increase in the volume of transport and the reduction in the working day. In England it gave rise to a congestion of traffic on a scale which was precisely similar to what occurred in all countries during the period immediately following the war. Naturally the difficulties involved in the reconstruction of stock were speedily overcome in highly developed industrial countries. But the crisis in connection with rolling-stock will last longer and be more difficult to surmount in countries whose resources are exhausted, especially in the countries of Eastern Europe, which are compelled to obtain locomotives and trucks from foreign countries.

The enquiry into the volume of goods traffic during and after the war should lead to a definite conclusion on the question whether, as many circumstances seem to show, the war, by giving an impetus to industrial activity and by promoting intercourse between the nations which were divided into two great alliances, has been responsible for an increased development of trade.

Unfortunately the great uncertainty which prevails on this subject cannot be dispelled by the figures given in the reports. The statistics dealing with the war period properly so called are of no great value in our enquiry. Transport, indeed, increased during this period, but the causes of the increase were essentially of a temporary nature, and a great deal of trade necessary in the conduct of the war for the supply of the civilian populations with food ceased at the Armistice or shortly after. As to the post-war period, it has been marked by such economic upheavals that all conclusions are rendered of little value by the special conditions in which the events occurred. We are dealing with dismembered groups of States, new countries under unstable political systems, regions in a state of anarchy, a vast empire completely isolated from the economic world, and monetary systems in a state of incredible disorder; all these factors have modified the previous situation and make it impossible to compare it with the present.

We are impressed among other things by the amazing instability of economic conditions. Immediately after the war there was a great increase in activity, but a crisis suddenly ensued which put a stop to this forward movement. Further, events have naturally taken different courses in neutral countries, conquering countries and conquered countries.

As has been very truly pointed out in certain reports, all this makes it impossible to form any very clear idea of the true position at present and the probable development of events in the near future.

It is not yet possible for us to arrive at any definite conclusions as to the development of transport since the war, and the influence which it has exerted on the volume of trade. Only at a later date, when the storm caused by this disaster, which is without precedent in history, has subsided, and a new order has been established, will it be possible to form a correct estimate of the results of the war on transport, which is, as it were, a synthesis of all human activity. The provisional conclusions which may be drawn from the following figures must, therefore, be accepted with all due reserve.

When we examine the subject matter of the reports we are impressed by the heterogeneous nature of the statistical information supplied by the various States. The units of measurement which ought to be applied to transport by rail are the passenger-kilometre and the ton-kilometre, which combine in one statement the whole idea of the traffic handled and the distance covered. It is, however, only in countries with a railway organisation of long standing and with a competent statistical service that it has been possible to produce these figures. For the other countries we must rest content with approximate estimates of transport, such as the distance covered by trains, the number of passengers carried, the nature of the goods shipped, and, in the last analysis, the receipts which would be derived from this traffic calculated at the same rates.

We may note further that new countries which have come into existence as a result of the dismemberment of their States possess no pre-war statistics regarding their territories, and that consequently it is impossible to institute a comparison with the present position; further, the new railway administrations, organised in troubled times unfavourable to systematic enquiry, are without the necessary means of carrying out investigations.

Thus, in spite of our best efforts it has not been possible to outline very clearly or draw any very precise conclusions from the general account of the development of transport since the war.

If we begin with Western Europe we note that in England the total number of passengers carried in 1919 by the sixteen principal railway companies was 974,000,000, or an increase of 19 % as compared with 1913.

The receipts from the carriage of goods rose in 1919 to £ 5,000,000—an increase of 7 % as compared with 1913, basing the calculations on the tariffs then in force; but this percentage rose to 20 if the transport effected on behalf of the Government is taken into account. The nature of the traffic, however, has slightly changed; on the one hand long-distance consignments have increased, and on the other, goods previously carried by coasting vessels have been absorbed by the railways.

Belgium calls attention to the fact that, out of an average of 31 passenger trains running daily on her railway system, only 18 were running in 1921. The conclusion must not be drawn that the number of passengers has declined in the same proportion; as a matter of fact the number of passengers, which fell from about 204,000 in 1913 to 102,000 in 1919, rose to 80,000 for the first five months of 1920. In July 1914 the number of international trains passing through Belgian territory was 60. In March

1921 only 35 of these had been restored, with shorter routes and fewer passengers.

Quite apart from the war period strictly so-called, it is clear that the mere fact of strained international relations must, in the case of a transit country like Belgium, inevitably react on passenger traffic, but everything seems to point to the fact that the situation will soon become normal again.

In 1913 the volume of goods traffic was on an average 30 trains per day for the whole system ; in January 1921 the number of goods trains was only 20. These facts represent an actual decline in the carriage of goods. While before the war 20,000 trucks per day were in use, in 1919 and 1920 the figures fluctuated between a minimum of 10,000 and a maximum of 18,000. In 1921 the industrial crisis reduced the number to 15,000 ; goods carried amounted to about 5,500,000 tons in 1914, they fell to 700,000 immediately after the armistice, and rose to 4,000,000 tons in 1920.

In Luxemburg, which is also essentially a country for transit traffic, the number of passengers fell from 8,000,000 in 1913 to 5,500,000 in 1920, and goods from 8,000,000 tons in 1913 to 4,000,000 in 1920.

In France the distances covered by passenger trains over the whole of her railway systems declined from 246,000,000 kilometres in 1914 to 128,000,000 in 1920, and the distance covered by goods trains from 154,000,000 to 134,000,000. The number of passengers decreased from 541 to 527 millions; but as the result of the increase in the average distance, a total of 22 milliards passenger-kilometres was reached in 1920, as against 19 milliards in 1913. On the other hand the transport of goods declined from 51,925 million ton-kilometres to 48,700 million.

It will be at once noticed—and later figures will confirm the truth of this general statement—that the war led to a fuller employment of trains. The load was increased and the speed reduced with a resulting increase in the traffic unit both for passengers and for goods. These are signs of more economical working. It may, therefore, reasonably be predicted that when economic equilibrium has been restored these factors may contribute to counteract the effects of the general rise in prices on railway rates. All the reservations we have made as to the conclusions to be drawn from a study of the present situation apply to this forecast.

In the case of Spain, a fairly large increase in the annual number of travellers carried is to be noted. The number rose from 50,000,000 before the war to 84,000,000 in 1920. With regard to goods, the figures rose from 29,000,000 tons to 35,000,000 tons. The reason for this increase is clear : Spain was a country poorly developed as regards railways, and her trade was not only never interrupted but was actually improved and increased by the war.

In Central Europe, Sweden supplies no comparative statistics, but there is good reason to believe that their traffic developed to a marked degree, especially as regards the export of ores.

Between 1914 and 1919 Norway records an increase of 56 % in the number of passengers, and 19 % in the tonnage of goods. In Denmark, traffic also developed to a remarkable extent between 1913 and 1920. The number of passengers rose from 23,000,000 to 31,000,000 per year, and goods from 6 to 8 million tons.

As regards traffic, Switzerland did not enjoy the same favourable conditions as other neutral countries. In May 1914—the date of the opening of the National Swiss Exhibition—the time-tables showed a large number of trains. Passenger traffic, which had steadily developed up to that period, was interrupted by the declaration of war ; the mobilisation of the army led to a reduction in the number of trains available for the civilian population, and when circumstances would have permitted an improvement in traffic conditions, the shortage of coal was an obstacle. Passenger traffic through the country, or coming from abroad, came to a complete stop. On certain lines, such as the Simplon line, traffic ultimately fell to 2 % of the normal figures.

Since the restoration of peace, passenger traffic, which is of such great importance to Switzerland, has continued gradually to improve. As is pointed out in the report, however, there are still certain obstacles in the way of the resumption of normal traffic. These obstacles are connected with the difficulties arising from the issue of passports, customs formalities, the unsatisfactory economic position of travellers from certain countries, the great increase in fares, and the fact that former political and economic relations between the various countries have not yet been fully restored.

In spite of these difficulties the number of passengers, which had fallen, from 128,000,000 in 1913 to 103,000,000 in 1918, rose to 114,000,000 in 1919. The amount of goods carried remained practically stationary, but the nature of the traffic underwent a change. Imports increased as compared with exports ; moreover, like all countries without an outlet to the sea, Switzerland has experienced rather serious difficulties in securing supplies.

Train traffic in Germany diminished in 1920.

In Germany rail traffic decreased by 35 % as compared with 1913. These figures apply to the Prussian and Hessian railways, but the report states that it may reasonably be taken as representing the position of the whole German railway system. The railways are short of resources, and traffic has fallen off as a result of the gravity of the economic situation. The report gives no further details on this question.

In January 1921 the distance covered by passenger trains in Austria was only 34 % of the pre-war figures. Between 1919 and 1920 the transport of goods declined, but no precise figures have been given. On the outbreak of war, passenger-trains on the Government railways in Hungary covered 181,000 kilometres daily. During the war these figures declined to an amazing extent, and fell almost to zero during the revolutions. A return is gradually being made to former conditions, and in 1921 the distance covered daily was 20,000 kilometres, or rather more than 10 % of the pre-war distance.

There is a considerable volume of passenger traffic in Czecho-Slovakia (113,000,000 persons were carried in 1919, as against 153,000,000 for the whole Austrian system in 1913), but no detailed particulars are supplied which will enable us to determine to what extent traffic has increased within its territory since the war. It would, moreover, be difficult to provide such information, as Czecho-Slovakia is a new State which possesses no statistics of its own for the pre-war period. As regards goods, the quantities carried in Czecho-Slovakia amounted to 33,000,000 tons in 1919, as against approximately 36,000,000 tons in 1913 for the whole Austrian system.

The statistics with regard to transport in Poland do not permit of any comparison being made with the pre-war period. The same statement may be made as regards Roumania, Finland, Esthonia, Lithuania and Latvia.

In the Serb-Croat-Slovene Kingdom 445 trains were running daily before the war ; this number was reduced by more than half in 1920 (206) ; statistics regarding the number of travellers and the amount of freight are lacking.

In Bulgaria the number of trains was 39,678 in 1911 and 41,245 in 1919-1920. The number of passengers carried, which in 1911 had been 3½ millions, rose to about 5 millions in 1920. Goods, on the other hand, declined from 2,000,000 tons to 934,000.

The Greek statistics do not give figures for the Macedonian railways. Comparative tables with regard to Greek railways strictly so-called reveal the fact that the distance covered by rolling-stock in 1919 shows, as compared with 1914, an increase of 66 % for standard-gauge lines, and a decline of 13 % for narrow-gauge lines.

Passenger traffic in 1919 was greater than in 1914 by 14 % on standard-gauge lines and 11 % on narrow-gauge lines. Goods traffic by slow trains was 9 % greater on standard-gauge lines and 1 % greater on narrow-gauge lines.

The slow goods traffic was 9 % greater on the standard-gauge lines and 1 % greater on narrow-gauge lines.

In conclusion, it may be said, subject to all the reservations necessary in the case of such deductions, that in countries in which the former economic organisation has not been destroyed, or which have regained economic stability, or are on the point of doing so, traffic has increased ; in all other countries it has decreased, and some time will certainly elapse before it will resume its former proportions.

XLIX.

It was necessary to undertake a special enquiry as to the amount and price of the fuel available, for one of the features of the transport crisis during and after the war was precisely the scarcity of fuel for railways.

Even in England, which supplied half Europe with coal, prices increased fourfold. Large coal for locomotives, which was quoted in 1918 at 20s. 2d. f.o.b. rose to 80s. in December 1920. Prices, as is generally known, have fallen considerably since that date. The railways of the United Kingdom consumed before the war 13,000,000 tons yearly—a consumption which remained practically constant.

In France the railways in 1913 consumed 8 million tons at an average price of 22 fcs. In 1920 the consumption was rather higher : 9 million tons, and the price rose to 238 fcs. per ton. The fuel consumed in 1920 came from Germany (Ruhr and Saar), England, America, and the French mines themselves.

In Luxemburg, Saar coal before the war cost 20 fcs. per ton ; in 1920 the price rose to 100 fcs.

In Spain, coal costs from 90 to 125 pesetas per ton.

Sweden used foreign coal only to a very slight extent, and this coal cost on an average in 1914, 16 crowns per ton.

Norway also imports English coal ; while she paid 20 crowns for it in 1914, she paid prices varying from 90 to 136 crowns from 1918 to 1921.

In Denmark, prices rose from 20 to 121 crowns.

Up to 1918, Switzerland drew her supplies of coal almost exclusively from Germany, as before the war, but towards the close of 1918 Germany discontinued her supplies and recourse had to be had to Belgium, America and England ; in 1920 almost all the coal consumed came from America.

The average price per ton, which was 27 fcs. in 1913, rose to 190 fcs. in 1920. The situation subsequently improved.

The railways of the Austrian Empire were in a position to obtain the greater part of the fuel required within the country itself ; the State railways, for example, bought 84 % of their annual supply from mines within the country, and imported the remaining 16 % from England and Upper Silesia. As these supplies were obtained under contracts, it was possible to check the quality, and thus good coal was obtained.

As such measures cannot be adopted at the present time, the quality is inferior and the consumption is greater, thus, while 2,500,000 tons were sufficient before the war for haulage on all the lines of Austria, within her present limits 3,750,000 tons are now necessary for the same work.

After the dismemberment of former Austria, her supply of coal was seriously imperilled as a result of the loss of productive areas, and these difficulties were more serious as communication with foreign coalfields, particularly Czecho-Slovakia, Germany and Poland, were at this period completely interrupted. In consequence of negotiations, especially with Czecho-Slovakia and Germany, the supply of coal has improved to some extent.

The price of coal from the mines of the country varied before the war from 13 to 17 crowns per ton ; after the war the price of Czecho-Slovak lignite rose to 135 Czecho-Slovak crowns per ton ; Ostran coal to 424 crowns ; Upper-Silesian coal to 304 marks ; native Traunthal coal to 917 Austrian crowns ; and Graz-Flach lignite to 889 Austrian crowns.

The scarcity and high price of coal are one reason why Austria limits the number of trains running on her lines.

In peace-time Hungary extracted from mines within her own territory 76 % of the coal which she required ; the remainder was obtained abroad, particularly in Prussian Silesia. The amount which she requires at present is 141,000 tons per month ; the position at the time when her report was drawn up was such that her requirements were not completely met. The report supplies no information as to prices, but they cannot differ greatly from Austrian prices.

Germany, which is a coal-producing country, states that she also is suffering from a shortage of fuel, owing to the supplies which she is bound to deliver. This growing scarcity of fuel is accompanied by a steady decline in quality.

As an example of the scarcity of fuel, the report points out that the railways, which in 1914 held a stock for 95 days, later held only enough for nine days or even five days.

The use of coal of poor quality damages the locomotives and leads to an increase in consumption. In 1914 the consumption of the German railways per locomotive-kilometre slightly exceeded 14 kilogrammes; in 1919 the consumption for the same unit rose to 21 kilogrammes and even at a later date to 50 kilogrammes (it is probable, however, that the load drawn by the locomotives increased also).

In 1913 Germany consumed 16,000,000 tons of coal, including some lignite, which cost 13.20 marks per ton, excluding freight. The total consumption has fallen off slightly (consumption per unit has increased while the number of trains has diminished), but the price rose to 254 marks excluding freight. 17 % of the coal used is obtained from the Ruhr basins, 21 % from Upper Silesia and the remainder from Lower Silesia, Saxony, and other mining areas.

The Italian railways consumed, before the war, about 2,200,000 tons of English coal of high quality from the Cardiff and Newport coalfields; but during the war it was necessary to resort to coal of all kinds, with the result that the total consumption in 1920 rose to 3,400,000 tons, including a small quantity (108,000 tons) of native lignite.

English coal of good quality cost in 1914, including freight, 36.33 lire per ton; in 1919 the average price rose to 397 lire; it reached a maximum of 695 lire in November 1920. Certain subsidiary Italian systems paid for English coal as much as 800 lire per ton, c. i. f. Genoa or other Italian ports.

It should be pointed out again that in 1921 the price of coal fell considerably.

The Czecho-Slovak railways required in 1920 1,000,000 tons of coal and 3½ million tons of lignite. Consumption per unit has increased by about 50 %, chiefly as a result of the poor quality of the coal used.

Before the war, local industries, especially in Bohemia and Moravia, drew their coal largely from Prussian Silesia. As the amount of Silesian coal has considerably declined, it has become necessary to allocate to these industries, which as a rule cannot use coal of inferior quality, native coal of high quality; thus nothing but native coal of poor quality remains for use in locomotives, and on that account the engines are being damaged. Two-thirds of the quantity consumed are supplied by the lignite fields of Northern Bohemia and the remainder by the Ostrava-Kervin Basin (Teschen country), by the Falknow Basin (North-West Bohemia) and by other smaller fields in the country.

Pre-war prices were 5 crowns for lignite and 14 crowns for anthracite, but in 1919 prices had risen to 52 Czecho-Slovak crowns for lignite and 115 for anthracite, and in 1920 to 160 and 380 crowns.

Turning to Eastern Europe we note that the results of the shortage of coal are still more striking.

Before the war the Polish railways drew their supplies of coal from Upper Silesia ; for reasons which are easily understood, deliveries from Upper Silesia have since the war been very irregular.

In Poland, as in the whole of Eastern Europe, wood is largely used as fuel for locomotives. The consumption thus amounts to 140,000 cubic metres of wood per month, in addition to 300,000 tons of coal. The report gives no information as to prices.

As the Serbian mines were burned or destroyed during the war, the Serb-Croat-Slovene Kingdom is without this source of supply ; it now obtains its supplies from the mines of Bohemia and Herzegovina (Krek and Onica, Zgosca-Breza and Mostar).

The annual consumption on the Serb-Croat-Slovene railways is about 250,000 tons. The price per ton, which before the war was about 10 dinars, is now 120 dinars.

Before the war Roumania consumed only 86,000 tons of coal, which cost her 37 lei per ton, but she used 220,000 tons of lignite at 15 lei, 235,000 cubic metres of wood at 9 lei, and 176 tons of petroleum. She consumes to-day 198,000 tons of lignite, costing from 116 to 212 lei ; 5,000 tons of coal at 356 to 426 lei ; 118,000 tons of petroleum at 500 lei, and about 2,000,000 cubic metres of wood at 100 lei. This consumption is likely to increase as traffic is restored.

During 1920 the total consumption of coal on the railways in Bulgaria amounted to 333,000 tons, all the supply being drawn from the State mines at Fernik. The price, which was 80 to 100 leva, has now risen to 120 leva per ton.

Greece uses English coal. In 1914, 11,000 tons, costing 37 drachmœ per ton, were consumed on the standard-gauge lines.

In 1919 the consumption rose to 37,429 tons, including 2,400 tons of native lignite and 1,000 tons of wood. The fuel used in 1919 was obtained from various sources, and the average price was 270 dr. for coal, 140 for lignite and 72 for wood. The consumption per unit increased.

Among Baltic countries Esthonia points out that in 1920 she encountered serious difficulties in obtaining supplies of fuel. For that reason she was compelled to resort to wood during a great part of the year and she has begun to use native coal, beds of which are being worked by the railway administration itself.

Lithuania is also experiencing difficulty in securing the small quantity of coal which she requires (120 to 140 thousand tons per year) and must therefore have recourse to wood. The same conditions prevail in Latvia, but to conserve her forests she intends, as has been shown already, to develop electric traction.

The conclusions which we feel entitled to draw from the above facts relating to fuel are optimistic in the sense that the coal crisis on the railways, which was a direct result of the state of war, is already over. Exports have been resumed, and henceforward no country need be without a quantity of fuel adequate for her needs.

Prices remain high as compared with pre-war figures, but this circumstance is to be explained chiefly by the depreciation of money.

The essential causes of the increase, reckoned on a gold basis, are the same as those of the general rise in prices, and are closely connected with labour conditions.

A comparison of the present prices in the various countries would be meaningless, as these prices are shown in different currencies which have depreciated in varying degrees.

We have already mentioned another conclusion of a general nature. The consumption of fuel per train-kilometre has greatly increased. This increase is due to two causes : one, which is of a temporary nature, is the poor quality of the coal used ; the other, which, it may be predicted, will prove permanent, is connected with the development of a characteristic feature in the technical progress of the railways, which has received considerable impetus from the necessities of the war: the increase in the weight of trains.

In Europe, before the war, as a result of the abundant supply of labour and the facilities for obtaining supplies of coal, it was possible to work the railways with a large number of trains and small loads. On the other hand, in America, where more powerful engines were used, it was the practice to concentrate traffic in heavy trains. Experience has shown that the latter system is preferable from the point of view of the cost of working ; the crisis of the war, as we have already stated, encouraged this tendency, which will very likely prove permanent.

We may also mention the example set by the Americans in France, where they operated the lines giving access to their ports of disembarkation according to their own methods. The increase in the weight of goods trains may therefore be regarded as one of the valuable results of the war ; this increase tends to reach the same proportions as in America ; it leads to reduction in freight rates, but involves the introduction of the technical improvement to which we have already referred. This improvement, which was under consideration before the war, began with the use of the continuous brake on goods trains inaugurated during the war by Germany when she adopted the Kunze-Knorr system. If this system should not be accepted by the States Members of the League of Nations, Germany, under Article 370 of the Treaty of Versailles, would be obliged to alter it, for the type of brake for goods trains is essentially an international question on account of the constant exchange of rolling-stock between different systems and different countries. In any case this is a question which must be settled at an early date.

Germany makes no reference to this innovation in her report. Sweden alone has stated that she was about to equip her goods trucks with the Kunze-Knorr continuous brake which was selected by Germany.

In all countries without exception, railway tariffs increased considerably during the war and even more during the period immediately following it. During the long period of peace which preceded the war, a general and constant tendency to reduce railway tarifs had become apparent. Generally speaking, this reduction did not apply to transport of all kinds ; only certain classes of goods had the benefit of reduced tariffs, which, while lowering the average level of prices, largely developed traffic. Reduced fares led to an increase in passenger traffic, and special tariff regulations applying only to classes of goods with possibilities of development improved conditions in goods traffic. This tendency was the expression of a sound economic idea, beneficial alike to the public and to the railways. The latter, indeed, as a result of the increase of freights, which were not very remunerative but easily handled, compensated for the increase in their general expenses. If, moreover, general expenditure increased on account of the inevitable development of plant and the increasing complexity of the administration, gross expenditure, on the other hand, diminished as a result of the constant progress made in technical matters which permitted the employment of more powerful and more economical engines, trucks of large capacity, and, in general, of improved equipment.

This tendency towards reduced tariffs was encouraged by the fact that the working of the railways was gradually passing under the control of Governments which were more inclined to make experiments in reducing tariffs even without knowing beforehand what the result would be. Keen competition of producing countries in the world's markets was the impetus for an attempt to overcome the obstacle presented by customs duties by means of reduced freight rates. Briefly, dumping was always a decisive factor even in railway rates. The economic upheaval caused by the war not only checked these tendencies but brought about a movement in the opposite direction, and led to an enormous rise in the cost of transport. We are of opinion that it would be interesting to estimate the extent of these increases in rates. The questionnaire has supplied us with the figures which we shall classify and summarise below. But at the outset it must be noted that these statistics are of comparatively small value in the matter of railway tariffs. As a result of the differentiating measures to which we have alluded, these tariffs have become so complicated that they invariably include a large number of rates for different classes of goods or passengers or different kinds of transport (through trains or omnibus, slow or fast trains, complete truck-loads or small consignments), and vary according to the competition between different companies and between railways and other means of transport.

As a general rule, the increase in tariffs manifests itself first in the abolition of existing facilities (return tickets, circular tickets, season tickets, etc.), and in higher rates for Sunday tickets and increased State taxes.

The next step has been a systematic increase in rates, strictly so-called—*i.e.*, all rates were raised according to complicated rules—that is to say, by applying different rates according to the distance and the method of transport.

As a general rule the proportion of increase was lower for cheaper forms of transport, the increase in the cost of third-class tickets being less than for first- and second-class tickets.

In certain countries the increase in the freight rates was less in the case of goods where the rise in prices had been greatest, such as fuel or essential articles such as food-stuffs. What we have said is enough to show that the variations in tariffs can only be determined by reference to averages or to particular cases, but no matter which method is employed, the information thus obtained does not give an accurate explanation of the facts, for in order to form a correct idea of the subject as a whole, it would be necessary to make a comparison of the various classes of transport considered separately.

As will be seen, the rates of increase vary in different countries and are naturally much greater in countries with a depreciated currency than in those where the currency has remained sound. But these differences are for the most part only apparent, since in a country where the currency has remained stable an increase of 10 % would be exactly equivalent to an increase of 100 % in a country where the currency, during the same period, had depreciated to a tenth of its value.

To sum up, it may be stated that a real increase in the cost of operating railways has occurred in all countries as a result of the adoption of the eight-hour day, the falling off in the discipline of the personnel, the scarcity of the materials employed on the railways — all of which causes have contributed in almost the same proportion to the rise in working expenses. Moreover, the difference in the amount of the rise depends on the attendant variations in the monetary unit in which the rise is expressed.

All such increases, which are the result in different countries of a whole series of badly co-ordinated and, occasionally, overlapping measures, render any investigation of the question difficult.

It may further be noted that a certain lapse of time always occurs between the appearance of the causes leading to a rise in prices and the increase in tariffs. It is natural, indeed, that Governments should feel unwilling, where the railways are worked by the State, to adopt, or, where they are worked by private companies, to sanction, increases in tariffs which, they have reason to fear, will react on the cost price of the necessaries of life. This delay in raising rates has gravely imperilled the financial position of the companies. For this reason their balance-sheets show large deficits which would have been wholly or partly obviated if tariffs had at once been raised to meet the costs of working.

The English report points out, without any comment, that an increase of 75 % in the case of passenger traffic and of about 112 % in the case of goods traffic has been made in pre-war rates in England.

It is desirable to compare these figures with those of another country whose currency has remained practically at its pre-war value · Switzerland. The Swiss report shows that, apart from the abolition of all tickets at reduced rates, which was adopted about the end of 1915, the last rise in tariffs, dating from August 1, 1920, brought the increase up to 55 % for 1st and 2nd class single tickets and 45 % for 3rd class tickets.

Goods rates have been raised several times since August 1st, 1920; the total increase represents an advance of 40 % on the pre-war tariff.

An additional burden was the abolition of most of the special rates.

Finally, the Swiss tariffs were amended on the principle of applying varying rates according to the distance, with a view to securing favourable conditions for long-distance transport.

The Swiss report points out that experience has shown the necessity of putting a stop to increases in rates, for there are already signs of a falling, off in the volume of traffic. Further, the increase in railway rates favours motor competition over short distances.

From the above considerations it appears that the increases introduced in the two European countries whose exchange stands highest are practically the same.

In Spain, which is another country with a high rate of exchange, the rate of increase in tariffs, both for passengers and for goods, is 15 %, but further increases may have been adopted since the date of the report.

In France, passenger rates, including taxes, have risen 80 % for 3rd class, 84 % for 2nd class and about 89.% for 1st class. On an average, freight rates have been raised 275 %. The increase is greater for valuable goods than for goods of small value and foodstuffs.

In Belgium, the passenger rates at present in force show, as compared with pre-war figures, a rise of 120 %, the effect of two separate increases. The increases which have been applied to goods vary from a maximum of 260 % to a minimum of 150 %, according to the kind of transport and the class of goods.

In Sweden, increases in passenger rates are made on a varying scale and give a preference to long-distance journeys and 3rd class traffic ; the rate thus varies from a maximum of 300 % 1st class for short distances to a minimum of 119 % 3rd class. Increases varying from 500 % for small packages over short distances and 204 % for truckloads over a long distance have also been introduced.

In Norway, passenger rates have been increased 380 % 1st class and 140 % 3rd class. The rate of increase for goods is 160 %.

In Denmark, the increase in the rates for passengers is 100 % and for goods 200 %.

As every neutral country has felt the effects of the war, none has escaped this special effect on tariffs, and only the greater or lesser depreciation of the currency has varied the rate of increase.

When we pass to Germany, we note that the rates of increase rise considerably. First-class tickets which before the war cost 7 pfennig per kilometre now cost 58.5 pfennig, and 4th class tickets have risen from 2 to 13 pf. The increases in goods rates amount to 900 %, the result being that freights at present cost ten times what they did in 1914. Moreover, further increases may have been decided on since the date when this report was drawn up (June 1921).

In Austria, the increase on passenger rates varies from a minimum of 929 % (3rd class omnibus trains) to a maximum of 1718 % (1st class through trains) ; freights, which have been raised on several occasions, have increased 6000 %. We have reason to believe that further increases have been introduced since then.

In Hungary, passenger rates have risen, by successive increases, 800 % and freights 600 %.

Czecho-Slovakia applies the Austrian tariffs in Bohemia, Moravia and Silesia, and Hungarian tariffs in Slovakia and Sub-Carpathian Ruthenia.

In Italy, at the end of 1920 the increase in the price of tickets was about 230 % 1st class, 210 % 2nd class and 170 % 3rd class. For most kinds of merchandise the tariffs have been raised 300 %, an exception being made in the case of a few articles in general use, where the increase has been restricted to 200 %.

In Eastern Europe, no information is available for Poland, but it may be noted that on the Serbian railways tariffs were increased immediately after the Armistice by 150 % for passengers and 150 % to 700 % for goods.

Further increases in rates followed, but we have no precise information on this point ; it is probable, moreover, that still further increases have since been decided upon.

In Roumania, tariffs were raised 600 % for 1st class, 500 % for 2nd class and 400 % for 3rd class. Freights increased 500 %.

In Bulgaria, tariffs were raised both for passengers and goods 400 %.

On the Greek railway system as it was before the war, passenger rates were increased 200 % and freights 280 %.

We have no information with regard to the tariffs of the Baltic States except in the case of Latvia. The report drawn up by this country states that in 1920 passenger rates were 24 kopeks per kilometre 3rd class and 48 kopeks per kilometre 2nd class (there is probably no 1st class), and freights varied per kilometric ton from 4 kopeks to 0.72 kopeks. In January 1921 these rates were increased 50 % for passengers and 100 % for goods.

In conclusion, it may be said that the increase in railway tariffs is only one of the aspects of the general rise in wages and the cost of raw material and of the depreciation of currency. It is necessary, however, to add that in countries which have suffered least from the war a certain tendency to counteract further increases is already becoming apparent in connection with transport. A beginning has even been made in cutting down these increases by restoring the old reduced scales or by disguising a return to lower rates under the name of a general reform of tariffs. Since the level of transport rates, the price of goods and the cost of labour are all interdependent, it is clear that to escape from this vicious circle a beginning should be made with the first of these factors, which can be modified much more easily than the general conditions of production, since it is more intimately connected with the control of the State finances.

The remarks which may be made on the financial situation of the railways are of the same nature as those which apply to tariffs. The net receipts of all systems, without exception, fell off during and after the war ; this decline is not the result of inadequate receipts but of a great increase in expenditure which the rise in tariffs has not followed sufficiently closely. Almost all the administrations thus show a deficit in their annual balance sheets, but the amount of this deficit varies greatly in different countries. The highest figures naturally occur in countries where the currency has depreciated. It must be repeated that this depreciation to a certain extent affects the whole problem. A deficit of several milliards in a country with a currency that has depreciated greatly is not very different from a deficit of several millions in a country where the currency is on a sound basis, when regard is had to the ratio of the two currencies. Naturally the situation in those countries which were neutral during the Great War or which were on the winning side, is essentially different from the conditions obtaining in countries which were disorganised as a result of defeat.

In England, which is the standard example of a country where the railways are operated by private enterprise, the railways were under State control from August 1914 until December 1918, in accordance with agreements which guaranteed the companies the same net receipts as in 1913, and, in addition, a reserve fund to cover the postponed expenses of upkeep. The period of control lasted from August 5th 1914 to August 15th 1921. The deficit which the State had to meet during the period of control was 40 to 50 million pounds per year; this is not a very large sum when account is taken of the fact that it applies to an original capital of about 1 1/2 milliard pounds, which in 1913 brought in an interest of 4.6 % (this interest was guaranteed by the State for the following years).

In France, the general co-efficient of operation (the ratio between expenditure and income) for all the systems, which was 63 % in 1913, rose to 71 % in 1914 and 1915, to 75 % in 1916, 84 % in 1917, 101 % in 1918, 127 % in 1919 and 132 % in 1920 ; it may be noted that the charges which had to be met out of capital rose from 806,000,000 in 1913 to 1,444,000,000 in 1920. The decline in gross receipts, the increase in expenditure and charges on capital led to a deficit of 389,000,000 in 1914, 358,000,000 in 1915, 345,000,000 in 1916, 555,000,000 in 1917, 975,000,000 in 1918, 1,850,000,000 in 1919 and 2,580,000,000 in 1920.

On all the great systems the receipts to 1918 exceeded expenditure if the charges on capital are not included under the latter head ; from 1918, the receipts were not even sufficient to meet the working expenses, strictly so-called. The expenses showed an increase of about 20,000,000 in 1918, 875,000,000 in 1919, and 1,136,000,000 in 1920. These figures are, moreover, not final, as the accounts for military transport have still to be liquidated between the State and the companies. It must further be remembered that the figures referred to above apply to an original capital of about 30 milliards of francs.

The Spanish report points out that the financial position of the railway companies is not prosperous ; it adds, without supplying any figures, that the receipts from working the railways are not sufficient to cover the costs and charges on capital, so that these companies have been compelled to ask the State for relief in the form of advances, which will be repaid later, in order to meet the increase in wages and the reduction in the working day, not to mention new purchases of rolling-stock.

In another neutral country—Sweden—the net receipts from the State railways amounted to 22,000,000 crowns in 1916, whereas in 1918 there was a deficit of about 45,000,000 crowns. This deficit disappeared in 1919, in which year there was a surplus of 5,000,000, which increased to 30,000,000 in 1920. Private companies have proved successful in keeping their profits at a fairly steady level.

In Norway, where there was a deficit of 3 million crowns in 1913 (it is not stated whether the expenditure includes charges on capital), the deficit rose to 11 million crowns in 1919 and in 1920, including the allowances for the high cost of living granted to employees.

Denmark states that the financial position of her railways is sound. Still confining our attention to neutral countries, we note that Switzerland in 1913 had a surplus of about 90 million francs to meet charges on capital; the surplus fell to 30 millions in 1918 and rose to 63 millions in 1919. The capital on which interest has to be paid is 2,670 millions.

Italy is one of the countries which suffered most from the rise in the price of coal, and this circumstance reacted on the financial position of her railways. The income from the State system (575 millions) showed a surplus in 1914 of 28 millions over expenditure (547 millions excluding charges on capital); in 1920 working costs rose to 2,690 millions as against receipts of 1,797 millions; the deficit was thus 860 millions. The co-efficient of operation rose from about 77 % in 1914 to 134 % in 1920. The capital exceeds 8 milliards.

The system of secondary railways and tramways also shows a marked decline in the net returns and therefore a deficit which must be made good by State subsidies.

When we turn to countries which suffered defeat in the war the deficits are found to be much greater.

In Germany, the surplus in 1913 exceeded a milliard marks—a sum which was more than sufficient to meet the charges on capital; in 1919 there was a deficit of 4 milliards (not including charges on capital), and this deficit rose to 11 milliards in 1920, with an addition of 2 ½ milliards for the interest on capital.

These statistics apply to the State railways at present administered by the Empire; as for privately owned lines, they are of practically no importance.

In the present Austria, railways are for the most part owned by the State. In 1913 the 19,289 kilometres of railway belonging to the State yielded a net profit of 190 million crowns; the charges on capital entailed an annual expenditure of 247 millions. The actual deficit when all the factors were taken into account was 51 millions. As regards the present Austrian railway system, the extent of which is only one-quarter of the former system (4,478 kilometres instead of 19,289), the deficit was 247 million crowns in 1919 and 3,589 million crowns in 1920.

The situation of the Hungarian State railways is, comparatively speaking, sound. Before the war, the net profit on the railways was 90 million crowns. It rose to 106 millions in 1918, and it must have increased still further during the following years, but the charges on capital are not included in these figures. In 1913 the net profit on the Hungarian southern system (Südbahn) was 9 millions, in 1918 it was 15 millions; but in 1919 and 1920 there was a deficit.

Czecho-Slovakia estimates that the deficit on her railways amounted to 240 million Czecho-Slovak crowns in 1919; this deficit rose to 625 millions in 1920; it is thought, however, that the deficit will be reduced to 265 million crowns in 1921.

Most of the States in Central Europe have no definite statistics which would enable them to compare the present with the past situation. We may, however, draw attention to a few observations contained in the reports.

In the Serb-Croat-Slovene Kingdom, the financial situation of the railways is very serious; the receipts hardly cover half the working costs. The adoption of the eight-hour day in an agricultural country like Jugo-Slavia has not only led to a general rise in prices, but has created an almost paradoxical situation. There could be no better example of the absurd lengths to which the application of this principle may be carried than the fact that it is necessary to have three shifts working eight hours each on lines over which only two trains run in 24 hours!

The Roumanian report records the following disastrous financial facts: the deficit in 1920 was 330 millions, while before the war there was an annual surplus of receipts amounting to 40 millions.

In 1911 receipts from the Bulgarian system amounted to 27 million leva, and expenditure to 17 millions, giving a surplus of 10 millions. In 1920 receipts were 143 millions, as against an expenditure of 200,000,000, making a deficit of 57 million leva.

Standard-gauge railways in Greece within her former limits (we have no data with regard to the Macedonian lines) did not pay very well in 1914, and profits were still smaller in 1919. The co-efficient of operation rose from 93 % to 101 %. The deficit, which, when all the charges on capital were taken into account, amounted to 5 million drachmæ, rose to 10 millions.

Narrow-gauge railways, on the other hand, yielded, and still yield, a profit.

The railways in Finland also show a surplus.

Esthonia is looking forward to the immediate future with confidence.

Lithuania, which in 1913, apart from the charges on capital, realised a net profit of 11 million gold roubles, showed a deficit of 12 million German marks for 1920. This altered position is attributed to the political difficulties arising from the occupation of Southern Lithuania by Polish troops — the military occupation having impeded goods traffic — and to the scarcity of money for the purchase of rolling-stock.

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In comparing these figures it must be remembered that the returns do not cover the same ground in different countries; certain countries, more particularly in reckoning the deficit, take into account — and this is the correct method — charges connected with capital; the others make no statement regarding either, and merely compare receipts with working costs for the period of a year. Whenever the terms of the reports enable us to do so we have stated whether the deficit included or excluded the interest on the capital employed ; similarly we mention the amount of the capital to which the annual profit or loss referred.

Moreover, when the documents which we had at our disposal permitted us to do so, we gave the statistics relating to the co-efficient of operation (the ratio between expenditure and income)—one of the best indications of the financial position of a railway system.

Heavy deficits are due primarily, as we have already pointed out, to the fact that tariffs were not raised in proportion to the increase in the cost of working expenses, as it was feared, and rightly so, that the result would be to raise the price of the necessaries of life ; these deficits are also due to the disorganisation which has overtaken all administrations and which is shown in an all-round increase in the number of the staff. Confusion, indeed, leads to more work as well as to an undue increase in the number of employees. This increase is entirely out of proportion to the work which would be required of a staff under normal conditions.

But there were other still more noticeable causes, the eight-hour day, for example, which also led to an increase in the number of employees. While it is tolerable in all industries in which piece-work predominates, the eight-hour day became specially burdensome on the railways as a result of the difficulties which were experienced in reconciling the varied requirements of the service with the shorter day. It is not too much to state that for many classes of personnel the apparently slight reduction of the hours of labour has involved doubling the number of the staff, and it must be remembered that this happened at a time when wages were increasing much more rapidly than it was possible to raise tariffs without incurring the risk of reducing receipts.

The rise in the price of fuel has also considerably aggravated the financial position, but while the coal crisis may be regarded as over, the increase in expenditure under the heading of staff appears to be very difficult to arrest. Almost everywhere railway employees are regarded as entitled to security of employment and to wages increasing with length of service · these employees, moreover, are a united body, well organised and prone to go on strike—a fact which, taken in conjunction with the weakness of Governments struggling with the difficulties arising from the war, has ntroduced a political element into the question of the fixing of wages.

When we consider that the expenditure on staff in an organisation common to all European railways represents at the present time 70 to 80 per cent. of the total working expenses, it will be easily understood how completely the restoration of railway finances is bound up with the question of the number and remuneration of the staff ; but it is difficult to suggest a solution because the question is as much a political question as an economic one.

Such are the reasons which may be advanced in support of the opinions of critics who maintain that great efforts and much time will be required before a return can be made to former conditions in which railway receipts and expenditure balanced. It is possible to accept this view provided always that we differentiate between countries which suffered seriously from the war and those which were victorious or remained neutral.

It is perhaps unnecessary to add that this state of affairs will, in spite of the vast schemes which have been drawn up in every country, hamper the development of railways. Private capitalists will probably be averse to investing money in railways, and public funds which are subject to especially heavy demands in those countries where the need for new lines is greatest, will not be able to take the place of private enterprise.

In presence of all these difficulties it would be foolish to shut one's eyes to the difficulties; the right course to adopt is to face them.

While all the chief European States complied with the request addressed to them, only a small number of States outside Europe replied to our questionnaire. Among these were eight American countries: Bolivia, Brazil, Canada, Chile, Guatemala, Haïti, Panama and Paraguay, and four Asiatic States: China, Japan, India and Persia, which sent in the required statistics.

In 1922 there were in America (according to the statistics contained in the *Archiv fur Eisenbahnwesen*) 554, 124 kms. of railway, but the countries which forwarded replies had only 75,135 kms. of line—that is to say, a little more than 13 % of the whole.

North America was represented by Canada alone ; Central America by the Republics of Haïti, Guatemala and Panama ; South America by Bolivia, Brazil, Chile and Paraguay. We are thus not in a position to draw up a complete account of means of communication throughout the length and breadth of the American continent.

Moreover, while the reports supply interesting information, especially from the point of view of a description of the various systems, they clearly show that the war had no serious effects on the working of the railways.

Further, the particulars supplied refer to regional systems exploited by many companies according to various methods and under a system by which freedom of organisation and full liberty to fix the tariffs were allowed ; we therefore do not possess the general statistical information which is necessary for bringing out clearly the characteristic features which we have noted in dealing with Europe.

Canada, in 1914, owned 49,549 kms. of line and 62,583 in 1919. This is a rather remarkable increase, amounting to about 20 %, and shows that building was in no way checked by the war. Canada is a vast and sparsely populated country, and her railways have not arrived at that final state of development which has been reached in Europe; it is prosperous to a degree and can develop that prosperity still further by opening up new means of communication.

The great trans-continental lines in Canada, such as the Canadian National Railway, the Grand Trunk Railway, and the Canadian Pacific Railway are well known ; they represent five-sixths of the whole system, the remaining sixth consisting of local lines.

The Canadian lines are of the European standard-gauge and can use the same rolling-stock as the adjacent lines in the United States.

We have no statistics on the volume of goods traffic and the financial position.

The Haitian Republic is rather densely populated in comparison with other American territories. The need for means of communication is therefore keenly felt. In 1915 there were 252 kms. of narrow-gauge railway, all having their terminus at Port-au-Prince. No new lines have been laid since 1915, but we are unable to state whether this fact is to be attributed to the war.

In the Republic of Guatemala there are 1,103 kms. of railway, and in the Republic of Panama rather more than 500 kms.

Brazil owns 28,127 kms. of line, the larger portion of which—25,104—is one-metre gauge. The report calls attention to the fact that the construction of a system of this importance is a remarkable achievement for a country like Brazil.

It has to import from abroad both rails and rolling-stock ; labour is scarce and therefore dear ; further, the difficulties presented by the ground are great and varied. The population, again, is grouped into a few widely scattered centres, since Brazil has only 30 million inhabitants on a territory as large as Europe.

It will be necessary to lay new lines to link up some of the existing systems which are at the present time unconnected.

In Bolivia 523 kms. of railway are in operation and 671 kms. under construction.

At present Chile owns 9,000 kms. of railway, as against 6,370 in 1912. Moreover 10,000 kms. of new line are in contemplation.

The capital invested in railways is 700 million gold francs ; in 1918 receipts were 123 million gold francs ; the figures for traffic are 27 million for passengers and 16 million tons for goods. Coal is obtained from the national mines.

Paraguay has few railway lines (in 1912 there were only 373 kms.), but new and important lines are in contemplation. It should be noted that this country has many large navigable rivers which supply it with means of communication throughout its whole extent.

Still quoting the statistics contained in the *Archiv fur Eisenbahnwesen*, we are able to state that Asia had in 1912 107,230 kms. of line, and the countries which replied to the questionnaire (China, Japan, Persia, British Indies) had, at this date, railway systems amounting to 74,770 kms., that is to say about 70 % of the whole. Their reports enable us, therefore, to form an idea of the importance of the Asiatic railway systems, since, apart from Asiatic Russia, for which we have no statistics relating to the war period, those railways are all in China, Japan and India.

In China there were 10,918 kms. of lines in operation, 3,572 kms. under construction and 22,810 kms. which were being planned or for which concessions had already been granted. In 1915 China had 629 locomotives; the number rose to 653 in 1918. The volume of traffic, which was 20,494,650 train-kms. in 1915, amounted to 23,398,242 train-kms. in 1918. The number of passengers increased during the same period from 20,043,209 to 25,740,841, and goods traffic from 32,473,043 to 44,490,538 tons. The consumption of coal was 504,285 tons in 1915, and 631,313 tons in 1918. The price of this coal rose from 6.72 to 7.86 Chinese dollars.

We possess no further information, but we have every reason for believing that the effects of the world-war on Chinese railways were of small importance.

Japan, on the contrary, experienced the effects of the war, in which from the very outset she took an active part, especially on the industrial side.

The necessity for opening up communications by land with her allies gave a great impetus to traffic through Russia. It should be added that Japan has always been deeply interested in the question of direct communication with Europe by rail. For this reason she was a party to the Berne Convention, and she inaugurated passenger and freight services between the Japanese and Korean railways and the Chinese and Russian railways. Among the various direct passenger services, mention may be made of the two great routes known as the "Circular route *via* Siberia and Suez" and the "Route round the world *via* Siberia and Canada".

In 1914 the Japanese railways were largely operated by the State and were of a total length of 10,568 kms. The Government, following a prepared plan, annually laid about 350 kms. of new line. During the war, however, it was impossible to carry out the work on the full scale demanded by the plan, but in 1919 the length of the system was 13,223 kms.

Rolling-stock increased during the war, the number of locomotives rose from 2,500 to 3,101, passenger coaches from 6,440 to 7,250 and goods trucks from 42,614 to 51,065. During the years immediately preceding the war, railway transport was passing through a period of serious depression ; but in 1915 an area of unprecedented prosperity opened for Japanese industry and commerce and this lasted down to the armistice. Passenger traffic at this time showed an increase of 119 %, and goods traffic an increase of 11 %. Passenger rates had to be raised from July 1918 by 25 % for third class, 75 % for second class and 117 % for first class. A further increase, which involved an additional 20, 30 and 40 % for the threeclasses respectively, followed these earlier measures. Freight rates were raised 20 % in 1918 and again increased in 1920 by 28 %. The consumption of fuel on the Japanese railways rose from 1,700,000 tons in 1914 to 3,070,000 tons in 1919 — an increase of 72.5 %, which was accompanied by a 40 % rise in prices.

The financial results proved satisfactory even during the period when the effects of the war were most acutely felt. In 1914 the net return on the capital invested (1,007,000 yen) was 5 % ; it rose to 7 % in 1919. After the armistice a period of depression set in.

Owing to her distance from the theatre of war, Japan, while suffering no injury directly due to hostilities, benefited by the increased activity arising from the war.

British India also felt the effect of the war and experienced some of the characteristic difficulties directly caused thereby, such as shortage of stock and labour and the attendant delays in carrying out repairs.

During the war the Indian railways supplied Mesopotamia and other theatres of war with a number of locomotives and much rolling-stock. Indian workshops were employed in the manufacture of ammunition, and the result is a shortage of stock for present requirements. But the railway administration acted prudently, for it at once began to secure supplies of the necessary stock, the purchase of which involved a very heavy outlay in 1920.

Passenger and goods rates were slightly increased; the consumption and price of fuel rose. The coal in use is chiefly of native origin.

India has about 50,000 kms. of line. Traffic developed largely during the war (it rose from 26 million passenger-kms. in 1914 to 32 millions in 1920; from 23 million ton-km. of goods in 1914 to 32 millions in 1920).

Persia is poorly provided with railways (the existing lines do not greatly exceed 250 km.), but the present Government intends to encourage the growth of railways. It is considering new lines and is investigating plans which have been submitted by private companies desiring concessions.

II.

INLAND AND OCEAN NAVIGATION.

The enquiry on the subject of ports and shipping could not be as complete as that on railways, as in most cases the railways are a State monopoly, held by the very Governments which were to reply to the questionnaire, or to a certain extent, are under their control. For inland and ocean shipping, which are, as a rule, subject to no control, except in certain cases which we shall mention later, information and data are undoubtedly more difficult to obtain. Further, the effects of the war on shipping, and the condition of ports, cannot in any way be compared with its effects on the railways, of which the resources were more directly taxed. It is undoubtedly common knowledge that ports and canals suffered heavily and that many vessels were destroyed as a result of submarine warfare, but, with very rare exceptions, the damage done to ports and canals did not interrupt transport, and the shipping losses were speedily made good, thanks to the mobilisation of the industrial resources of the whole world. Whilst each of the belligerent countries had to supply from its own stock material for the repair of destroyed lines and damaged rolling-stock, in matters of shipping the resources of countries which were neutral or distant from the theatre of war could be drawn upon as effectively as those of the countries which were directly concerned.

We shall see that although the railway crisis still continues as a result of the shortage of means of transport, a superfluity of tonnage, which was only to be expected in view of the increase in ship-building and the absence of the demand created by the war, has already become apparent in the case of shipping.

We shall follow the same plan as that adopted in the case of the railways, dealing first with European countries and then with extra-European countries. We shall also draw a distinction between inland and ocean shipping.

I. *Navigable Waterways.*

Among the countries of Western Europe, France and Belgium supplied fairly complete information regarding the condition of their shipping.

In 1913, the navigable waterway system of France had a total length of 11,316 km., 4,880 of which was canal. As a result of the restitution to France of Alsace-Lorraine, the canal system has been increased and now includes 11,791 km. in operation. The navigable waterways destroyed during the invasion represented a length of 1,036 km. and have already in nearly every instance been reopened to shipping. Plans are being drawn up and works carried out for the widening of certain canals with a view to making them accessible to vessels of 600 tons, and for the improvement of the Seine between Bougival and Rouen and of the Rhone between the Swiss frontier and the sea.

The French river ports, of which the traffic in 1913 exceeded 10,000 tons, numbered 678; since the restitution of Alsace-Lorraine, they number 700. Further, during the war, the Government established numerous railway connexions with river ports, and equipped the harbours with the constructions necessary for berthing and mooring, and with suitable plant. Some of these connexions will be done away with, others will be employed for commercial traffic.

According to statistics drawn up in 1912, there were, on the French navigable waterways, 15,141 ships of various sizes with a total capacity of 4,035,199 tons. During the war 2,000 of these vessels were destroyed, but, under the Treaty of Versailles, the river fleet is to be increased by tugs and Rhine vessels, together with all other tonnage which is to be handed over by Germany.

The goods transported over the French system of waterways amounted in 1913 to 41,896,754 tons. In 1920 the tonnage was only 21,500,000 tons, — that is to say, rather more than half the pre-war tonnage. Up to 1914 the Government had taken no part in the operation of inland waterways, and although they had been constructed and were kept in repair by the State, they were entirely at the disposal of private enterprises. The necessities of the war compelled the State to requisition stock and to place inland shipping under military control. After demobilisation, certain regulations dealing with charter-parties, bills of lading, and the control of freights were maintained.

Despite this control, freight charges have increased considerably in comparison with those of 1914. Freight between Rouen and Paris which, before the war, varied between 3.50 and 5 francs per ton, in 1912 rose to a maximum of 32 francs. It then fell in proportion to the decrease in the price of coal. The latter, which before the war had cost 20 to 35 francs for the qualities used in shipping, rose to 500 francs, and fell again to 220.

The rise in the present cost of inland waterway transport occasioned certain important comments in the Belgian report.

The present state of inland navigation — in Belgium and elsewhere — is characterised by the considerable increase in the cost of water transport as compared with the pre-war cost. This increase is so great that it has led to a paradoxical result : the price of water transport exceeds that of transport by rail ! Thus, inland navigation has lost the sole important advantage it had over the railways — cheapness ; this is obviously a menace to inland navigation, which is today only used because the railways cannot meet all the transport demands made upon them, and because the exorbitant price of rolling-stock prevents the purchase of new trucks. A time will come when the railways will be provided with new rolling-stock ; if inland navigation does not then find some means of reducing its freight rates, the present atrophy will degenerate into complete stagnation, and shipping will enter upon a period of decay.

The present rates on the Belgian system of navigable waterways are 5 to 10 times higher than those existing before the war ; therefore it appears difficult to reduce them sufficiently to restore the margin which existed before the war between transport by rail and water transport.

Shortly after the Armistice, the Belgian Government established the State Service of the I. W. T. (Inland Waterways Transport) for the working of tugs which had been abandoned by the enemy and seized as booty. This service is not a monopoly, for there are 150 privately owned tugs which, as they compete with these Government tugs, exercise a controlling influence on the cost of towage. Nevertheless, this represents a state interference in an industry which had hitherto been completely unrestricted ; an interference which is aggravated by the existence of local committees responsible for distributing traffic between the railways and the waterways, having due regard to their respective rates and the requirements of industry and commerce. When there is a shortage of rolling-stock, the railways refuse to supply trucks to those shippers who can, without disadvantage, use the waterways.

The Belgian report itself admits that before expressing any opinion as to this innovation, which would lead to a working agreement between railways and waterways, the experiment must be continued for a certain length of time.

In seeking to explain the reasons which led to the rise in freights for inland navigation, the Belgian report states that it is impossible to speak of a decrease in the total tonnage which Belgium has at her disposal in view of the fact that the losses incurred by the destruction of shipping have been made good by this war booty. Thus, the rise in freight rates can only be explained by the increase in the cost of ship-building and working expenses, together with the decrease in working hours.

Tugs which in 1914 cost 180 to 225 francs per h. p. now cost 1,000 to 1,500 francs ; the cost of a steel barge of 300 tons has risen from 25,000 to 150,000 francs ; a wooden barge of the same tonnage from 12,000 to 45,000 francs, and the cost of a Rhine barge of 1,350 tons has increased from 100,000 to 400,000 francs.

Before the war, the monthly pay of crews hardly exceeded 175 francs for the captain and engineers ; it now amounts to about 700 francs. In the case of stokers and sailors the proportion of increase is even greater.

As regards fuel, the price of the briquettes used on ships before the war was 20 to 25 francs ; at present a truckload of briquettes costs 155 francs loaded. All other material used in the shipping service has undergone a similar increase in price.

The new regulations on working hours have brought about an increase in the duration of voyages by 18 per cent. in summer and by 9 per cent. in winter.

Passing to Central Europe, we notice that in Germany, while the traffic of river ports amounted to a total of approximately 123½ million tons in 1913, it had dropped to 59 million tons in 1918 — that is to say, to half the previous figure ; according to the report, the decrease became even more pronounced in 1920. We have no further data at our disposal.

The inland waterways of Austria are the Danube, with the ports of Vienna—Freudenau, Vienna—Kuckelau and Linz ; Lake Constance, with the port of Bregenz and the landing stages of Hard, Lochau and Fussach.

The Austrian section of the Danube (from Passau to Theben) has a length of approximately 343 kilometres. Considerable slopes in its bed and the great differences of depth between the high and low water-levels had necessitated dredging operations, which will have to be continued. The ordinary work of upkeep has not been neglected.

The present economic situation of Austria does not allow her to carry out the vast schemes which had been planned before the war : the enlargement of the river harbour at Vienna, measures to improve the conditions of navigation and to render the banks of the river immune from floods, and the construction of a canal from the Danube to the Oder, which would ensure to Austria a natural means of access to the North Sea and to the Baltic. As we shall see later, the idea has been taken up by Czecho-Slovakia.

The Danube fleet, which is the property of two private companies, has been considerably reduced by war losses, which have only been partly balanced by new acquisitions ; the shipping on Lake Constance has remained unchanged.

During the war, the passenger service on the Danube was subject to restrictions and interruptions as a result of the shortage of coal and the seizure of ships by Hungary, Roumania, and Jugo-Slavia. At present, the service has improved, both because more coal is available and because certain obstacles of an international nature have been removed.

Goods traffic was also interrupted during the war ; it has been now resumed, and trade is carried on with Jugo-Slavia, Bulgaria and Roumania.

The passenger traffic on the Danube increased in 1918 in comparison with the traffic of 1913, owing to the fact that the Austrian railway service was extremely defective. In 1919 it diminished considerably; it is estimated at 990,457 passengers as against 2,206,460 in 1913.

There is a smaller decrease in passenger traffic on Lake Constance. The transport of goods has also diminished considerably on the Danube, and has almost ceased on Lake Constance.

Before the war, freight rates on the Danube were fairly low as compared with the railway tariffs. At present the transportation rates have increased for passengers to 25 times and for goods to 80 times the pre-war figure.

Coal of native origin, as used on ships, cost 15 crowns per ton and foreign coal 23 crowns. In 1920, the prices had risen to 243 and 434 crowns respectively.

Before the war Hungary possessed 3,502 kilometres of navigable waterways, 1,500 on the Danube and 602 on the Save; as a result of the new frontiers, the system is only 1,400 km. in length, the Danube representing only 384 km.

In 1913, the Hungarian river fleet amounted to 164 steamships and 521 barges, of a total capacity of 121,171 tons. As part of the fleet fell into the enemy's hands, the Hungarian companies at present possess only 88 steamers and 304 barges.

In 1913, the Hungarian river traffic amounted to 2,181,013 passengers and 4,863,527 tons of merchandise. At the end of the war, and during the disturbances which followed it, traffic was for a long time totally suspended.

It was resumed at the end of 1919, and has increased to a certain extent, but does not reach the former figures because of the high price of coal.

Tariffs have very considerably increased: the transport of goods between Budapest and Vienna cost 300 hellers in 1913, 520 at the end of the war, and 13,200 at the time when the report was drawn up. A third-class ticket from Budapest to Vienna cost 4.60 crowns in 1913, 9 crowns at the end of the war, and 200 at the time when the report was drawn up.

Czecho-Slovakia, with its territory situated on the watershed of Central Europe, between the North Sea, the Baltic and the Black Sea, is well supplied with rivers, since the Elbe, the Oder and the tributaries of the Danube rise in Bohemia, Moravia and the Carpathians. The total length of the navigable waterways belonging to the New State is 761 km., 348 on the Moldau, 223 on the middle Elbe, 172 on the Danube and 18 on the Oder.

The Czecho-Slovak Republic has considered a vast number of schemes for the improvement of conditions of river navigation, and for the employment of the available water-power. It intends to construct a canal joining the Elbe and the Danube, which would connect with the Oder near Oppeln and with the Vistula near Cracow, and also a canal joining the Vetava to the Danube, to say nothing of the canalisation of the Oder in order to effect a junction with the port of Stettin, where the Treaty of Versailles assigned a free zone to Czecho-Slovakia.

The former Austro-Hungarian Empire had contemplated constructing a canal from the Danube to the Oder, between Vienna and Moravska–

Ostrava. Its course will be modified to conform to the requirements of the new State.

The navigable waterways of Czecho-Slovakia are provided with well-equipped ports. An important new harbour at Prague is under consideration. 82 million kr. will be set apart for its construction; it is hoped to recover the greater part of this sum by the sale of land which will be reclaimed from floods.

A scheme is also on foot for the enlargement and improvement of three ports on the Danube: Bratislava, Komarno and Parkan; the cost is estimated at 415 million kr.

The tendency of the Austro-Hungarian Empire was to send all its foreign traffic *via* Trieste, its only seaport, and it took no interest in navigation on the Elbe, the development of which was to a certain extent checked.

The Bohemian boatmen and shipping companies preferred to deal with German companies, as the German Government promoted navigation. Thus, although Czecho-Slovakian traffic represents 33 % of the total traffic on the Elbe, no company of any importance has been left on former Austrian territory, and the Czecho-Slovak-owned fleet is comparatively unimportant.

We have little information regarding Czecho-Slovak traffic on waterways. In 1913, 2,808,695 passengers were carried on the Elbe between Leitmeritz and Dresden, and in 1918, 1,324,304 (65 kms. of the distance is in Czecho-Slovakia).

Before the war, the goods traffic on the Elbe and the Vltava (between Prague and Hamburg) amounted to 3,487,000 tons. We have no information respecting the extent to which this traffic was affected during and after the war.

In the case of Switzerland, the Rhine is the principal navigable waterway giving access to the sea.

During the war, there was no connection between navigation on the Rhine and ocean transport. At the end of the war, traffic on the Rhine was resumed with an intensity which was all the greater in view of the fact that the railways were passing through a critical period; when the railways have resumed their normal working, Rhine traffic will diminish.

All the ports of the Rhine, from its mouth to Basle, are capable of meeting any demands that may be made on them, and their plant did not suffer during the war. Directly after the Armistice, Switzerland undertook the construction of the Port of Bale—Petit Huningue, which will cost approximately 10 million francs.

As a navigable waterway, the Rhine can deal with the same amount of traffic as before the war. In the section between Strasburg and Bale, which has not yet been regularised, the long interruption of shipping has caused some damage; this will be remedied by means of dredging. On the Rhine, as elsewhere, freight rates have increased to such an extent that they are in excess of railway rates.

In Italy, the war drew attention to the desirability of developing inland navigation. The canal from the Po to Brondolo in the Venetian Lagoon has been constructed ; another canal from Milan (where a large inland harbour is being built) to the junction of the Adda and the Po, is under construction ; thus Milan will be joined to Venice by a waterway.

The Venetian area will include 1,400 km. of waterway, part of which is already in operation and the remainder is in course of construction. In the whole of the peninsula the total length of the navigable waterways is 4,847 km., 1,811 of which remain to be completed.

In 1913, the transport effected for the whole system was estimated at approximately 9 million tons ; this underwent a decrease during the war, but it is stated that traffic is already recovering.

In Eastern Europe, Poland, which has many waterways, intends to complete the improvement of the Vistula, to reconstruct the Augustowski and the Krolewski canals, which were destroyed during the war, to complete the port of Warsaw, which is at present under construction, to build new harbours at Cracow, Plock, Wioclawek and Tezew, the plans of which are at present being considered. The circular canal of Warsaw is being constructed, and the extension of the Dombrowa-Warsaw-Wiala canal, which is to ensure communication with Danzig, is under consideration.

Polish shipping is at present operated by the State ; but the Government intends to hand it over to private concerns. The material is in bad condition. Freight rates heve increased considerably.

The Serb-Croat-Slovene Kingdom has a great many waterways, the total length of which is 2,091 km. The Danube accounts for 522 km. of this total, which, apart from the section known as the Iron Gates, where it was necessary to construct canals, is well suited for navigation, as the minimum depth is greater than two metres.

The Save, the Drave and the Tisza are partly available for navigation. New works to be carried out include the improvement of the middle Danube and of the Save, and the construction of dykes to prevent flooding.

Three new canals are being contemplated : one from Vukovar to Samac, which will join the Danube and Save ; another from the Danube to the Adriatic (following the Save to Sisak, the Kupa to Velika Kapela, then joining the Adriatic by a tunnel 24 km. in length ; total cost four hundred million dinars) ; lastly the Morava-Vardar canal of a minimum length of 640 km.

The equipment of the ports which already belonged to Serbia is somewhat out of date, but they are in a favourable situation for loading and unloading. The Austro-Hungarian ports were better equipped, but they suffered serious damage during the war.

In order to restore the waterways to their normal condition, it will be necessary to raise vessels which were sunk and bridges which were demolished ; to repair wharves which had been damaged by bombardement ; to reconstruct the stores, offices and dwellings for the personnel and all other buildings destroyed by the enemy ; to arrange for the dredging of sandbanks, to obtain cranes and grain-elevators, and generally all requisite plant for loading and unloading. This is all urgent work, which is only hindered by lack of funds.

Serbia herself only possessed an insignificant fleet ; the whole of the merchant fleet on the Danube and its tributaries belonged to Austria-Hungary. As a result of captures effected during the war and sessions since the Armistice, the Serb-Croat-Slovene State at present possesses one-third of the fleet which plied on the Danube, although—as the report points out—half the navigable section of the Danube system is in Yugo-Slav territory. The material is in rather bad condition.

In 1912, the goods traffic on Serbian navigable waterways amounted to 446,000 tons. In 1919 transport in the whole of the Serb-Croat-Slovene Kingdom increased to 1,965,000 tons. Since then it has increased considerably.

Before the war, Serbian shipping companies required State subsidies ; in 1919, a shipping syndicate was formed, of which the State is a member, and which, from its very first financial year, has been able to show a satisfactory balance.

Roumania possesses approximately 2,840 km. of navigable waterways ; the main course of the Danube accounts for 1,075 km. of this total, its secondary branches for 395 km. ; the rest is made up by the chief tributaries of that river.

There are 36 ports on the Danube. Up to the beginning of the world-war their construction and upkeep had cost Roumania nearly 126 million lei. These ports are well equipped, especially for grain traffic. Urgent work will have to carried out, both for the ordinary upkeep and for the improvement of the waterways and ports ; the total expenditure is estimated at five hundred million lei. Of the fourteen million tons which represent the total of purely river traffic on the Danube, the share of Roumania amounts to approximately six million tons.

22 % of the tonnage, 34 % of the vessels and 66 % of the passengers carried are Roumanian.

The number of craft of every description sunk in the lower Danube during the war was approximately 250, of a total tonnage of 150,000. It is proposed to spend 250 millions for the increase of shipping. The present rates applied to goods are ten times higher than those in force before the war ; in the case of grain, the rates are 25 times higher. Before the war, the fuel generally used on the vessels, a by-product of petroleum, known as Mazout or pacura, cost 30 lei per ton ; it now costs 550 to 820 lei.

The report states that in order to meet the requirements of river transport in the near future, to ensure the upkeep of the navigable waterways on the lower Danube, and to complete the equipment of the river ports, it will be necessary to spend approximately 2 milliard lei.

In 1911, Bulgaria possessed nine ports on that part of the Danube which formed her frontier with Roumania ; these were reduced to seven by the cession of Silistria and Turtakai. Only a few of the Bulgarian ports have been improved. These are Russe (Rustchuk), Sistova-Lum and Vidin. These ports are being enlarged and equipped with new plant.

In 1911, the traffic in these Danube ports amounted to 669,265 tons of merchandise, unloaded and loaded, and 364,653 passengers.

The Greek rivers are not navigable. There is, however, an important river fleet flying the Greek flag which carries goods on the lower Danube between Turnu-Severin and Galatz. This fleet, which numbers 355 barges of a total tonnage of 319,344, forms approximately half the river tonnage used between the mouths of the Danube and the Iron Gates.

Among the Baltic States, Lithuania, which, with the exception of the northern area watered by the tributaries of the Dvina, is situated in the basin of the Niemen, possesses 5,772 km. of waterways, including the Augustovo Canal, 93 km. in length.

Except in the Memel region, the fleet suffered considerable damage during the war.

To reorganise inland navigation and render it able to meet the requirements of transport it will be necessary to carry out a whole series of engineering works and to obtain new vessels, together with dredgers, excavators and cranes, etc.

The navigable waterways of Esthonia are the river of Emajogi, with the port of Tastu (Dorpat), and the lake of Peipous, of which the most important ports are Kodawere, Mustvec Ranna-Pungeria, Wasknarva (Syrenetsi). Other waterways which were formerly employed are now abandoned. Navigation in Estonia is impeded by the long winters, during which the rivers are frozen. Further, the country is lacking in cheap and heavy produce, such as minerals and coal, which are generally transported by water.

The following are the general conclusions as regards inland navigation in European countries which may be drawn from this enquiry. Navigation was also disorganised by the war ; this disorganisation is due to the prejudicial effects involved in the displacement of the frontiers, rather than to damage which was the direct and immediate result of the war.

From a technical point of view, inland navigation made no progress during the war : we should, however, note the tendency shown in many countries to extend their waterway system, to improve and enlarge their ports and equip them with the necessary plant. As in the case of the railways we must repeat that it would be useless to expect speedy results from these far-reaching schemes, for the general lack of financial resources hinders the execution of the contemplated improvements.

With regard to working conditions, it could only be expected that the cost of river transport would increase far more rapidly than that of transport by rail. Railways are everywhere either managed or controlled by the State, and the Governments avoided or prevented heavy increases in rates until the existence of large working deficits showed the necessity for adapting the rates to the increased expenditure. On the other hand, navigation, which is entirely in the hands of private concerns, immediately adapted itself to the increased demand for transport and the increase in working expenses.

Thus it came about that at certain periods, the cost of transport by water became higher than that of transport by rail, but this phenomenon should be regarded as transitory. Freights began to fall even before the railway tariffs, and when prices become more stable, navigation will once more offer its services on terms which are more advantageous than those of the railways, otherwise it will lose its *raison d'être*, at any rate in the countries of Western and Central Europe, where railways are extremely numerous.

Inland navigation in extra-European countries does not call for any remark, as it suffered less from the war than the railways.

Canada is rich in waterways, but its report contains nothing of note with the exception of a striking description of its present system.

In the Republic of Haiti the only navigable river (150 km.) is the Artibonite, which is of material assistance in the development of that rich country.

Brazil possesses many large waterways. The report brings out the characteristics of these waterways on which the war had not and could not have any effect.

Bolivia also has many navigable rivers which assist her commerce.

Among the Asiatic countries which replied to the questionnaire, China occupies a remarkable position as regards inland navigation. She possesses a great river, the Yangtse, which is navigable for a distance of 2,500 km. from the sea. To this river must further be added a few tributaries of lesser depth. There are also many waterways which are suitable for small vessels. We have no exact data as to the amount of traffic and the cost of freight.

Persia has only two rivers which are really navigable: the Karun and the Shatt-el-Arab. Other rivers are only accessible to extremely small vessels. The ports on the Karun deal annually with 30,000 tons of merchandise.

2. *Seaports and Ocean Shipping.*

Among the countries of Western Europe, France devoted much effort during the war to extending and perfecting her seaports. (The English report supplies no information regarding ports or navigation.)

The French ports can berth eleven hundred vessels of all sizes. There are 654 berths for vessels with a draft of over 6 metres; 184 of these were built during the war.

In recent years, the French ports have been equipped with up-to-date mechanical plant, motor cranes and railway track. Part of this track and plant was erected by the Americans or the English.

The maximum capacity of the French ports is approximately 3,500,000 tons. The loading and unloading of goods reached its maximum in 1916 with 56,673,998 tons; this dropped to 41,000,000 tons in 1920.

The buildings suffered comparatively little as a result of the war; but during hostilities and immediately after the Armistice, maintenance and repair work could only be carried out as far as was absolutely essential. During the last few months great efforts have been exerted to make up for lost time, and these will be continued despite the considerable increase in the cost of labour and raw materials. The upkeep of the ports, which appeared in the budget of 1914 as item of 8,500,000 frs., is estimated at 46,000,000 in the budget for 1921.

Further, a vast scheme for engineering works intended to meet the increase in transport, which will follow the economic recovery and the reconstruction of the country, has been drawn up. This scheme for enlarging the ports will involve an expenditure of 3,300,000,000, half of which is to be borne by the State and half by the local authorities concerned.

Before the war the French merchant marine included vessels of a total gross tonnage of 2,555,775 (1); on January 1st, 1921, the total displacement had increased to 3,138,670 tons; of this amount 2,418,754 tons belonged to private owners, 452,943 formed the Government fleet, and 266,973 were derived from the German fleet.

The report states that regular shipping services are far from being in their pre-war state. If we take the services which have as termini the six great French ports (Dunkirk, Le Havre, Nantes, St. Nazaire, Bordeaux, Marseilles) we note that before the war there were 194 lines; 63 of these were totally suspended, 17 only ran at irregular intervals and only 48 new lines have been established.

The number of passengers who embarked in French ports was 2,912,278 in 1913, and 2,535,000 in 1920.

The cost of transport has naturally increased considerably as compared with the pre-war period. A few examples will show this. The price of a saloon passage from Havre to New York was 500 frs. in 1914 and 2,900 in 1921. A passage from Marseilles to Shanghai cost 1,680 frs. in 1914, and 5,450 in 1921. The freight rate for goods from France to Madagascar was 66 frs. per ton in 1914, and 198 frs. in 1921.

It should be noted that the prices quoted for 1921 do not constitute the highest figures reached for ocean transport. During the war they reached extraordinary heights; for example, freight rates from Saigon to Marseilles which were 23 shillings in 1914 had risen to 500 shillings in 1918; but they fell again to 115 shillings in 1920. It need scarcely be added that in view of the continual fluctuations which are peculiar to ocean freights, these figures must be considered average and approximate.

The cost of the fuel necessary for navigation has increased in proportions equal to those already mentioned in the case of the railways. In 1913 the Compagnie Transatlantique was paying 31.30 frs. for its bunker coal, 120.55 frs. in 1919 and 280.42 frs. in 1920. There was a fall in the price of coal in 1921.

As regards the general financial situation of the mercantile marine, it is impossible to supply any exact figures. But there can be no doubt that during the war and the period which immediately followed it, the mercantile marine in the whole world went through a period of great prosperity.

The French report contains a list of the fluctuating quotations on 'change of the shares of the chief ocean shipping companies. It may be noted that, as a general rule, the value of all these securities has risen considerably.

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(1) The reports do not all make it clear, in their information regarding tonnage, whether grsss or net tonnage or dead weight is meant. Whenever possible, we have supplied the lacking information from other sources.

The seven Belgian ports (Antwerp, Ghent, Zeebrugge, Ostend, Nieuport Brussels and Louvain) are in excellent condition. They are constantly being enlarged and equipped with new plant. New docks have been constructed at Antwerp, a new wet-floating dock parallel to the two older docks at Ghent, and the city of Brüges intends to revive its former splendour by making Zeebrugge a port for fast vessels which will be the terminus of the service between the Continent and the Americas and also a first-class fishing port.

The Belgian fleet numbers 213 vessels with a gross tonnage of 506,044 tons and a certain number of packet-boats, some of which are equipped with turbines and develop a speed of more than 23 knots.

As an example of the variations in freight rates, we may instance the price paid for the transport of coffee from Santos to Antwerp, which was 40 frs. per ton in 1913, then from 200 to 120 frs. in 1920, and finally 100 frs. in 1921.

In 1919 and 1920 the price of bunker coal of English origin varied between 400 and 525 frs, per ton, that of Belgian coal between 165 and 250 and that of American coal between 175 and 350 frs.

It is superfluous to add that the increase in the price of coal is one of the causes — but neither the sole nor the most important causes — of the increase in the freight rates.

The report of the Netherlands contains an excellent description of the equipment of the Dutch seaports, but supplies us with no definite information as to the influence of the war on ocean transport ; moreover, in the case of neutral countries, such influence was in every respect advantageous.

The Spanish ports are in good condition and many improvements have been carried out in them. A free port is to be built at Barcelona and the ports of Valencia, Cadiz and Algeciras are to be enlarged. The amount of goods loaded and unloaded reached 17 million tons in 1,920.

The Spanish fleet was increased during the war by the addition of 329 units of a total tonnage of 129,000 ; at present it numbers 1,192 ships of a gross tonnage of 1,007,192 tons.

The price of passages has increased by 150 to 200 % for first-class passages and from 50 to 100 % for third class.

The increase in freight rates has varied from 100 to 250 % according to the lines and the class of goods.

The chief ports of Portugal (Lisbon and Leixoes) are in good condition and have been improved. New wharves have been built, new docks constructed and high-power cranes installed. In 1919 the total traffic, including that of ports of secondary importance, amounted to 2,507,792 tons of goods loaded and unloaded, and 75,482 passengers.

The Portuguese fleet numbers 202 vessels of a total tonnage of 275,199 tons. The report contains no further information.

Sweden points out that in Central Europe the upkeep of ships was entirely neglected during the war to such an extent that certain ships had to be laid up. But although a few old craft were thus eliminated, there was on the other hand an increase in new units of heavy tonnage. Thus, on the whole, the fleet has been to some extent renewed. This remark may be applied to all the countries ; on the conclusion of the war, old vessels were everywhere scrapped and new ones built which were better calculated to meet all requirements, both by reason of their higher tonnage and their more modern and perfect construction.

The increase in the price of passages on Swedish steamers is stated to be 100 to 350 % ; that of freight rates sometimes reached 300 % and in the case of English coal 680 %.

There is no need to dwell on the price of bunker coal, which — unlike railway coal — does not vary from one country to another, as steamers coal in the course of their voyage, wherever they happen to be. Before the war only English coal was used in Swedish ports, and in 1920 half English and half American coal. This practice, moreover, is fairly general. The increase in the demand for coal which was due to the war gave rise to an increase in the import of American coal in Europe. But these imports are again beginning to decrease as a result of the comparatively high cost of American freight as compared with English freight.

Swedish ship-owners consider the present financial situation of shipping as unsatisfactory. This opinion applies to the more recent period when, as the extraordinary demand for transport during the war and immediately after the Armistice had ceased, the freight rates underwent a considerable reduction, while working expenses were not proportionately reduced. Although the price of coal has also fallen, this reduction is not sufficient to restore the balance and to give ocean-shipping a satisfactory financial basis.

The report states that the condition of the Norwegian ports can hardly be considered satisfactory. They proved inadequate during the war, which gave rise to congestion of traffic. The traffic was none the less considerable. The sums expended on the upkeep of the ports are limited, the Government granting no subsidies, and the cost of engineering works remains high. During the years 1914-1920, 1,350,000 crowns were spent on new constructions, and the schemes already considered provide for an expenditure of 2,809,000 crowns in the near future.

In 1914 the Norwegian fleet numbered 3,225 vessels, representing a gross register tonnage of 2,648,661. The number of vessels sunk by torpedoes or mine explosions amounted to 824, with a total gross tonnage of 1,237,192. In 1920 the fleet numbered 3,828 vessels with a total tonnage of 2,429,232.

The Norwegian passenger traffic underwent a considerable increase during the war, because many nationals of belligerent countries were obliged to pass through Norway or to travel on neutral vessels.

Naturally the price of bookings has increased. For example, in 1914 a passage from Bergen to Newcastle cost 72 crowns first-class, 108 in 1918 and 200 in 1920. On the other hand, in 1921 the price had already fallen to 180 crowns.

The freight rates for Norwegian ports have also increased. From the eastern ports of Great Britain to the eastern ports of Norway 7.54 crowns per ton was paid in 1914 ; in 1915 15.22, in 1916, 32.40 and in 1917, 176.10 ; during the war as much as 300 crowns was paid.

We do not give the prices of coal for Norway. They show no peculiarity that we have not already pointed out.

In the Norwegian report we find a remark which has a general bearing ; although the economic conditions under which navigation was carried on from 1914 to 1919 varied considerably, they may be considered as extremely favourable. However, in the second half of 1921 a reaction set in which gave rise to an unprecedented crisis.

This remark applies not only to Norwegian shipping but to that of all countries, because, whereas there were differences between neutral and belligerent countries during the war, once peace was concluded there was no further basis for such differences; accordingly all shipping is at present passing through a period of commercial depression.

Denmark and Germany supply no information with regard to their ports or mercantile marine.

Czecho-Slovakia was raised to the rank of a maritime nation by virtue of Article 363 of the Treaty of Versailles. Zones in the ports of Hamburg and Stettin have been assigned to it for a period of 99 years ; these are to be placed under the special régime of free zones and shall be used for the direct transit of goods coming from or going to that State.

In addition to these two free zones for direct maritime transport in the north, the Czecho-Slovak State is extremely interested in the commercial traffic on the Adriatic with which the Treaty of Peace assures to it communication by rail. Trieste particularly will serve as an outlet for part of its trade with the Far East. The Czecho-Slovak Government has therefore concluded a treaty with the Italian Government which assures to it the free use of the sheds and plant necessary for the transhipment of merchandise in the port of Trieste, not to mention coal depots and other facilities for direct transit.

Further, the Czecho-Slovak Republic will take advantage of every means to further the development of its ocean traffic on the Black Sea and of resuming communication with the countries situated on the coast of that sea, countries with which Czecho-Slovakia had already been in close connection during the war.

During the war Italy lost 267 steamships of a total dead weight tonnage of 1,046,386 tons. The present fleet (January 1st 1920) numbers 495 steamships of a total tonnage of 1,730,283 tons. We have no further data on the subject.

In Eastern Europe, Roumania has various ports on the Black Sea. The most important of these is Constanza, on the construction of which more than 100 million lei have already been spent. The equipment is especially adapted to the grain trade.

Repair work is in contemplation as well as the provision of plant necessary for maintaining a uniform depth of water in the docks, the upkeep of wharves and the increase of the capacity of the port. An expenditure of approximately half a milliard lei has been set aside for all these purposes.

There is also a scheme for a naval port on the Black Sea involving a supplementary expenditure of approximately 100 million lei.

The traffic of the port of Constanza has decreased considerably. The average of imports for the period 1910-1915 amounted to a total of 170,000 tons and of exports 1,200,000 tons. After the war — that is to say, during the year 1920 — imports of only 65,000 tons and exports of barely 13,000 tons were registered.

As the Danube is accessible to sea-going vessels for a length of 170 km. from its mouth, this section of it is used by a large number of ships going from the ports of Soulina, Tulcea, Galatz and Braila. It should be pointed out that 500 Roumanian or foreign vessels of an average tonnage of 2,000,000 enter annually by the Soulina mouth alone.

Roumania has an ocean passenger and goods service operating regularly on the Galatz-Constanza-Naples, and Constanza-Constantinople routes. Traffic on the latter line has also considerably diminished.

Before the war, the freight rate was approximately 10 lei per ton on the mail-packets on the Galatz-Alexandria line and 13 lei per ton on the cargo boats on the Galatz-Rotterdam line. After the war, freight on the Galatz-Naples mail line had risen to 260 lei, and on the Galatz-Atlantic line to 500 lei. The price of bookings for passengers is 28 times greater than before the war.

Roumania intends to purchase new steamships in order to extend the Galatz-Naples line as far as Marseilles and to resume the Constanza-Alexandria service; this will involve an expenditure of two milliard lei.

The natural harbour of Lithuania is Memel (Klaipeda), which affords access to the Baltic by the Kurisches-Haff. The restitution to the mother-country of this territory which has been detached from Germany will, as the Lithuanian report points out, prove of material assistance in the development of the port, especially after the building of the Sauliai-Memel and Kovno-Memel railway lines.

The most important port of Latvia is Riga. This is primarily a commercial centre for wood and grain, flax and hemp. We must also consider the ports of Windau (Wentspils) and Libau, (Leepaja). These ports, Windau in particular, were only slightly damaged during the war, and the Latvian Government is drawing up plans for the necessary repairs.

The most important port of Esthonia is Reval (Tallin), which, after having been one of the most important Baltic centres during the Middle Ages, was unable to maintain its former position under the domination of the Russian Czars. It should be noted that, once the Reval-Moscow line is built, the port of Reval will resume its rightful position, as a result of its proximity to Russia and the facilities it offers for trade with Western Europe.

Two years before the war, the Russian Government had decided to establish at Paljasaar, near Reval, a large naval base equipped with all the necessary installations. Esthonia intends to take advantage of this site to build a commercial harbour which will provide accommodation for 500,000 tons of shipping.

Esthonia possesses other secondary ports, which all require to be organised and enlarged.

This country, which has sea-traditions of long standing, has a fleet of 496 sailing and steam vessels with a tonnage of 33,821. Other ships are on the stocks. As everywhere else, the freight rates of Esthonian ports have undergone considerable increase but they began to fall again in 1921.

In 1914 the Greek ocean-going fleet numbered 474 steamships of a total tonnage of 830,000 tons and 884 sailing-vessels of a tonnage of 965,000 tons. During the war she lost 277 steamships of a total tonnage of 669,600 tons and 240 sailing-vessels of a tonnage of 18,000 tons. If we take into consideration ships which were newly acquired or built, the Greek fleet included at the beginning of 1921, 390 steamships and 11,000 sailing vessels of a total gross tonnage of 692,000 tons. It includes 200 cargo boats of a tonnage of 315,000 tons, which sail to foreign ports, especially to America, England and France.

Before the war the Greek merchant marine's most important traffic was in the Black Sea. (25 % of the tonnage leaving the mouth of the Danube flew the Greek flag.) Greece is confident that she will recover this traffic after the economic re-organisation of Russia and the resumption of the Roumanian export trade.

Among the American countries which replied to the questionnaire, Canada has a merchant service of some importance, which is largely employed in the service on the Great Lakes and the coasting traffic on the Atlantic and Pacific. The tonnage has increased from 649,759 tons in 1914 to 910,654 in 1920. The report does not supply any further information.

The republic of Haiti possesses 12 ports, of which the most important is the capital of the State of Port-au-Prince. In 1913 the total traffic which passed, through the ports was 1,194 vessels of a total tonnage of 2,276,765 tons, which in 1916 fell to 112 vessels only, of a tonnage of 420,474 tons. This decrease is due to the absence of the vessels belonging to the Hamburg-America Co., and the irregularity of the service of the Cie. Generale Transatlantique.

The latter has, however, resumed its former services, and there is every reason to expect that communications with Bordeaux and le Havre will recover the importance they had before the war. It is thought that the establishment of lines running between the ports of Haiti and the Mediterranean ports will make up for the absence of the German company.

The most important ports in Guatelama on the Atlantic are : Puerto-Barros, and on the Pacific, San José ; many lines with regular services call at these ports, but only one of them is in direct communication with European ports. The report expresses the wish that a direct line should be established between Barcelona and Puerto-Barros.

The general traffic of the ports from 1914 to 1919 underwent a slight decrease, as it dropped from 1,145,401 tons in 1914 to 1,110,105 in 1919 for incoming ships ; there was no change in the figures for outgoing ships : 2,240,000 tons.

The report supplies detailed information with regard to many Brazilian

Ports. These are, as a rule, well-equipped ports which have in no way suffered from the war. They are served by several regular lines, which are operated either by Brazilian or foreign companies.

The Chilian Government also devotes special care and attention to the upkeep of its ports. Considerable improvements have been carried out, and other schemes are in contemplation. The organisation of the ports of Talcahuano and San Antonio is complete, and that of Valparaiso will be finished shortly. Buildings are in course of construction in the port of Antofogasta. Further, there is a plan for the improvement of the ports of Arica and Iquique in the north, of Constitucion and Llino in the Central region, of Lebu in the coal district and finally of Puerto-Saavedra and Valdicia in the southern region.

In 1918, apart from coasting traffic, approximately 6,000 vessels of a tonnage of over fifteen million tons entered or left the ports of the Republic.

Chilian maritime commerce suffered considerably during the war from the shortage of shipping, as well as from difficulties in obtaining supplies of fuel, but the situation is again becoming normal in this respect.

China has numerous ports at her disposal, but we need only consider open ports *i.e.* those to which foreign trade is admitted as the result of treaties concluded with certain Powers who are, for this reason, known as "Treaty Powers".

The open ports are: Canton, Kia-Tchang, Tientsin, Lunkon, Che-Fu, Shanghai, the ports of the Yang-Tse and other secondary ports.

Navigation under the Chinese flag shows little development owing to the absence of laws for the protection of shipowners. The Government is at present taking steps to remedy this defect. The Chinese Merchant Fleet has 31,334 tons of shipping for long-distance voyages.

During the war Japan greatly increased her merchant service. In 1913 she had, 2,243 steamships and 9,151 sailing vessels of a total gross tonnage of 2,268,587 ; in 1919 the number of steamships had increased to 2,879 and that of sailing ships to 13,781 — a total tonnage of 3,785,683 tons.

Although we are unable to give the exact figures, we are in a position to state that this increase continued in 1920.

The building capacity of Japanese shipyards was also considerably increased during the war ; while before the war they could only build 17 ships of a 1,000-ton displacement annually, they were able in 1917 to build 157 of 5,000 tons. The general stagnation which prevailed after the Armistice dealt a very heavy blow to the Japanese shipbuilding industry. The Japanese shipbuilding yards have specialised in building vessels of heavy tonnage.

In 1913, several regular lines were already running under the Japanese flag. During the war, the Japanese took over the running of several lines which had been abandoned by other countries, so that the number of regular services at present kept up by Japanese ships is very considerable. According to the report, some of these lines are to be discontinued, partly because the crisis has reduced the shipping traffic and partly because in other countries shipping activity, which had been interrupted during the war, is once more being resumed.

Before the war, the sphere of action of the Japanese Mercantile Marine was limited to the adjacent waters, to the coasts of Japan and China and to the Indian Ocean. Under pressure of war necessities, the Japanese merchant fleet extended its operations to European waters, and to the Atlantic, where it rendered valuable services.

Since the War, Japan has continued to take an active part in this new sphere. The Japanese merchant service had to cope with an enormous amount of traffic ; as the war gave rise to an increase in the commercial demands of Europe on the Far East, the Japanese fleet effected the greater part of the transport which had thus become necessary.

As a result of the disorganisation of the Trans-Siberian Railway, and the fact that European vessels had ceased to sail in the waters of the Far East, passengers proceeding to Europe, America and Australia travelled in large numbers by Japanese lines.

In 1916, there were such difficulties in the passenger traffic that, after purchasing a ticket, it was necessary to wait several months to obtain a passage on a Japanese vessel.

During the war, the price of passages was not increased by more than 50 %, because the Japanese Government, as a rule, subsidised regular steamship services.

The increase in freight rates was a little less marked than in the case of the European merchant services. Thus, in 1912, the rate for cotton from America to Japan was $0.40 per ton and in 1917 $1.50.

In Japan, the cost of vessels, which is the chief factor in determining freight rates, underwent the following increase : in 1913, a ship of heavy tonnage cost approximately 100 yen per ton. A ship of medium or small dimensions, 125 yen ; in 1917 the prices had risen to 750 yen in the case of large vessels, 700 for medium vessels and 550 for small vessels.

In Persia, there is freedom of navigation for all flags in the Persian Gulf, on the Shatt-el-Arab, on the Karun and on the Caspian Sea. (The rights of Persia on the Caspian Sea are laid down in the new Commercial Treaty concluded with Russia.)

Navigation on the Caspian Sea is carried out chiefly by Russian vessels with *ports d'attache* at Astrakan and Baku. The most important Persian port on the Caspian is Enzeli, which serves the regions of Gilan, Teheran and Central Persia. Traffic on the ports of the Caspian has remained in its pre-war condition ; that is to say, it fluctuates about 800,000 tons of arrivals and sailings.

The ports on the Persian Gulf are chiefly visited by English vessels : Bushire is the most important. Before the war, the total shipping traffic (arrivals and sailings) was approximately two million tons ; in 1918 it increased to 2,290,000 tons, then fell to 1,565,000.

The information in the reports of the various States is not sufficient to give us a general idea of the activities of merchant shipping in the whole world. After the abolition of wartime restrictions, this activity began to show itself under conditions of complete liberty and unrestricted competition. We must, therefore, now give some information derived from other sources (Lloyds Register and various publications).

We have already pointed out that the losses suffered by merchant shipping during the war had been balanced by the impetus given to shipbuilding ; thus the gross tonnage of the whole world, which in 1914 amounted to forty-five million tons of steamships and 3,500,000 tons of sailing vessels, in 1919 had already reached a total of 51 million tons and in 1921 a total of 59 million tons of steamships and 3 million tons of sailing vessels *i.e.* sixty-two million tons in all.

We must note two technical points of a general nature : the marked decrease of sailing vessels and the increase in the displacement of ships. We have already seen that the fleet of sailing vessels had decreased by half a million tons. As regards the displacement of ships, we learn that in 1914 steamships of a gross tonnage of more than 6,000 tons numbered 1,236, while in 1921 they numbered 2,097. The world's shipping has been to a great extent renewed. Many old vessels were kept in commission during the war, but have been scrapped since the Armistice. More than one-third of the present merchant fleet has been built within the last five years.

The order of the countries of the world from the point of view of the importance of their fleet has undergone considerable alterations. The German and Austro-Hungarian fleets have disappeared. England still occupies the first place, but only possesses 37 % of the existing steamships as against 45 % in 1914. The United States have increased their fleet; in 1914 they possessed 9 % of the total tonnage of the world ; they now possess 27 % of this tonnage.

Japan, France and Italy have also increased their fleets. In the period which followed the Armistice, traffic has steadily declined, while the available supply of vessels has been increased by new units which were laid down during the war. Freights which in 1920 had remained at the fantastic rates reached during the war, as we have seen, began to fall in 1921, and at present are only about 50 % above those of 1913 ; these figures must, however, be accepted with the usual reservations.

But while freight rates were falling, working expenses remained high ; many ships are laid up and no new vessels are under construction. Ocean shipping is going through a crisis which, as we have already pointed out, is the exact opposite of that through which the railways are passing.

III.

MOTOR AND AIR TRANSPORT.

1. *Motor Transport.*

The marked development in motor transport is a typical example of the progress brought about in certain spheres by the War.

We shall reserve remarks of a general nature for the end of this report and, in the first place, summarise the information supplied by the reports in the usual order.

The United Kingdom has no official statistics regarding mechanically propelled vehicles, before, during and since the war. The only information we possess is that these vehicles must have numbered 700,000 in 1920. The development of motor traction may be approximately estimated by the ratio it bears to petrol imports. If we represent the quantity of petrol imported in 1913 by the index number 100, the index numbers for 1919 and 1920 are 125 and 169 respectively.

According to the English report, the development of motor transport has been furthered by various factors — the sale of many vehicles from army stocks, the higher efficiency and improved construction which was the result of experience gained during the war ; finally the increase in the cost of transport by rail, which has considerably widened the field open to the competition of motor transport.

There are at present regular motor-bus services on most of the English highways. Public conveyance by motor has undergone a considerable increase and covers long distances. These services are patronised partly by a section of the public recruited from the railway and tramway passengers and partly from a new class of traveller.

In England, motor transport has rapidly become popular with the general public, which prefers it to railway transport, although the latter is slightly cheaper. The possibility of collecting and delivering goods at a given address, the dispensing with packing and the elimination of risk of theft and frequent delays have induced many firms to effect their transport by motor.

At present certain large organisations are attempting to overcome the disadvantages arising from the existence of an excessive number of motor transport firms and from the resulting empty journeys. For this purpose clearing houses have been established which endeavour to procure loads for the return journey.

The high cost of petrol is calculated to promote the use of steam or electricity-propelled vehicles. The former of these is especially well- adapted to heavy models where speed is not essential. The other is specially suited to meet the requirements of delivery services, and of loading and unloading in warehouses, where precautions against fire have to be taken. On the other hand, until electric accumulators have been perfected, they will not be suitable for long journeys nor for transport on rough roads.

In 1914 France possessed 100,000 motor vehicles ; their number was more than doubled in 1920. Lorries in particular have increased by approximately 8,000 ; at present there are not less than 95,000.

Motor lorry transport, reckoned in kilometric-tons, has increased by approximately 850 %, although animal-drawn transport has only decreased by 12 to 15 %. Therefore, a large amount ot transport has passed from the railways to the roads.

According to the French report, the success of the motor is to be explained as follows : during the war, large numbers of men became familiar with this means of locomotion and aquired a taste for it. The sale of the army stocks and the persistence of the railway crisis contributed to bring about this result.

The French Government makes a grant of 5 millions per annum (1921 Budget) to public motor services which undertake the daily transport of passengers, luggage and mails.

In the Netherlands the use of motors for passenger traffic has also increased as a result of the liquidation of the stocks of the belligerents and the rise in railway tariffs.

In Belgium and Spain, motor transport have undergone a considerable increase.

Sweden affords a striking example of the extension of motor traffic. In 1907, she only possessed 662 motor-vehicles ; in 1919 she had 8,506.

Germany proves an exception to the general rule. On February 1st, 1920, there were in the whole of the Reich only 32,450 touring cars as against 60,876 in 1914. We have no information regarding motor lorries. The extension of motor traffic in Germany is in every respect hindered by the fact that she is unable to obtain certain essential raw materials. In view of the deliveries she has to make, she has only been able to keep small quantities of German benzol for home consumption ; moreover the price of inner and outer tyres remains extremely high. She also encounters obstacles to the circulation of her vehicles beyond the frontiers, because the States which are adjacent to Germany have not all adhered to the International Automobile Convention (October 11th, 1919) and require excessive deposits at the customs before allowing cars to enter their territory.

In Austria similar reasons have militated against the extension of motor transport.

Hungary has witnessed a reduction in the number of motor vehicles in circulation, which has decreased from 3,000 before the war to only 1,500 at the time the report was drawn up.

Motor mail services, which were frequent before the war, have been abolished.

Czecho-Slovakia possesses approximately 5,000 motors of every description. The transport of goods by motor has begun to develop since the war.

The Italian report supplies no information regarding the development of motor transport, although this development has also been considerable in Italy, for the same reasons which apply to the other countries.

The production of petroliferous motor spirit on a large scale constitutes a factor which is extremely favourable to the development of Roumanian motor transport. On the other hand, the state of the roads, which are in an extremely bad condition, places her at a disadvantage. Further, she has no home motor industries, and moreover is without repair shops and trained chauffeurs. The import of cars is on the decline. The Government is investigating the questions relating to the development of motor transport

In Bulgaria motor services are very slightly developed.

In Esthonia motor transport has not hitherto been carried out on a very large scale. The Government intends to establish motor services to make up for the inadequacy of the railways ; but the bad condition of the roads hinders the carrying out of this scheme.

The reports of the American countries give no detailed information regarding motor transport; they only state that in Chile and Bolivia the use of motors is steadily increasing.

In Asia, Persia, which is badly supplied with railways but fairly well provided with good roads on which passenger cars and motor lorries are already circulating, would be extremely well suited for the development of motor transport. There are no regular public services as yet, but the formation of such services is being considered. It is an undoubted fact that in Persia motoring will be furthered by the existence of considerable stocks of petrol which have hitherto only been partially tapped.

The extended use of motors is one of the characteristic results of the war in the sphere of transport ; if the war had not thrown an enormous quantity of low-priced vehicles on the market, the present development of motor transport would not have geen possible. As a matter of fact the chief obstacle to the development of mechanical transport on ordinary roads before the war was the high cost of motors.

Moreover, the disorganisation of the railways had considerable influence on the development of motor transport and more especially on the transport of goods. It is difficult to prove that motor transport costs less than transport by rail even to-day when railway rates have been increased, especially as the cost of motors and petrol is still high ; there can, however, be no doubt that when we consider the great number of thefts and the delays which take place on the railways, transport by motor lorry guarantees a more rapid delivery and less risk of damage. In order to profit by such advantages the public has no hesitation in paying higher prices.

It may be asked whether, in view of the reorganisation of the railways, motor transport will continue to make the same progress. This is extremely doubtful, for in normal times the railways can offer their services at lower rates. It should, however, be noted that motor traffic will keep the ground it has gained even if it makes no further conquests, particularly in the sphere of short-distance traffic, as economy in loading and unloading of trucks forms a large item in transport of this nature.

2. *Air Transport.*

As regards air transport, the report which supplies the best information is that of the Netherlands, where the question has been most throughly studied. Naturally we are dealing with civil air transport, as the technical improvements in aircraft for military use does not fall within the scope of our enquiry.

In August 1919 the first exhibition of air transport was held at Amsterdam under the distinguished patronage of the Government and the municipality. Its aim was to show the general public that it was possible to employ aircraft for transport ; several Governments took part in it and it was a great success.

In November 1919, the Government set up a committee for the study of questions relating to civil aviation.

The Government has given further proof of the interest it takes in these matters by placing the aerodromes of Shiphol and Schellingwoude, which had formerly been used for military aviation, at the disposal of private aviators. These aviation grounds will gradually be equiped with the necessary installation for civil air transport at the expense of the State, and suitable landing-places will be made at points situated on the air routes which terminate at these two aerodromes.

A provisional agreement has been concluded with England and Germany which provides for the regular exchange of meteorological information and reports by wireless. Grants have been made to a private company for aerial navigation.

Legislative measures dealing with air transport are being considered. There are at present daily services for passengers and mails between Amsterdam and London and between Amsterdam and Hamburg-Bremen. The latter line connects with the Bremen-Berlin and Hamburg-Copenhagen lines. The services which were suspended in November 1920 were resumed in the spring of 1921.

The Czecho-Slovak report informs us that the Prague-Paris air line was established in 1920 (a distance of 900 kilometres, which is covered in six hours) and that it is operated by a private company subsidised by the State. This service, which was inaugurated in September 1920, has had to be suspended during the winter. In 1921 the Prague-Warsaw line, 500 kilometres, was established. A Prague-Berlin and Prague-Vienna international line and a Prague-Bratislava-Kosice national line are in contemplation.

Roumania also attaches much importance to civil aviation, and in her report supplies us with statistics and information regarding the plans she intends to carry out ; these plans include the construction of a certain number of aerodromes with a view to operating 3,200 kilometres of lines. Air ports will be made at Bucharest, Galatz, Chisinau and Craiova at an estimated cost of 335 million lei. The annual working expenses are estimated at 78 million lei.

Some idea may be formed of the tariffs which will be adopted from the fact that a ticket from Bucharest to Paris would cost 3,000 francs, that the transport of merchandise would cost 30 francs per kilogramme, and that of letters 13 francs per 20 grammes or fraction of 20 grammes. The Government subsidises the company which operates these lines. A law dealing with the establishment and working of air navigation lines has been passed.

The amount of information contained in the reports is obviously insufficient to allow us to form a complete and satisfactory estimate of the state of air transport. These reports contain rather information regarding schemes which are being considered than services which have actually been established and are running regularly. It is clear that we are passing through a period of expectation or perhaps of uncertainty. The war gave rise to an extraordinary development of, and an exceptional technical improvement in, air transport; but hitherto we have not had sufficient experience to be able to state definitely that aviation will be suited for civil transport on a more or less large scale. It is probable that difficulties of an economic nature will be added to difficulties of a technical nature, so that only a very limited section of the public will be able to avail itself of this transport, the cost of which will always remain extremely high. Therefore this kind of transport will not lend itself, at any rate for a long time, to the introduction of regular and continuous public services, for such services must be able to rely on firmly established currents of traffic which are not liable to very excessive fluctuations.

F. Tajani.

GENERAL SCHEME OF THE STATEMENT REVIEWING THE TRANSPORT SITUATION.

(For reference.)

RAILWAYS.

Material.—Condition of lines and railway engineering works ; urgent repair work ; works necessary for complete restoration ; proposed improvements and construction of new lines ; condition of rolling-stock.

Traffic.—Number of trains running ; passenger traffic ; tonnage of goods carried.

Tariffs.—Increase in passenger and freight rates.

Fuel.—Total consumption of each kind of fuel ; sources from which fuel is obtained ; cost price per ton.

General financial situation of the railway systems.

OCEAN AND INLAND NAVIGATION.

Material.—Condition of ports ; congestion ; condition of waterways ; urgent repair work ; work necessary for complete restoration ; proposed improvements and construction of new ports and waterways.

Traffic.—Merchant services ; passenger traffic ; tonnage of goods carried.

Freights.—Increase in rates for passengers and goods.

Fuel.—Total consumption of each kinn of fuel ; source from which fuel is obtained ; cost price per ton.

General financial Position of Shipping.—Ocean navigation ; inland navigation.

DEVELOPMENT OF MOTOR TRANSPORT.

DEVELOPMENT OF AIR TRANSPORT.

STATEMENTS

submitted by the States which took part in the First General Conference on Communications and Transit.

AUSTRIA.

Preamble.—A comparison of the state of communications and transport in Austria before and since the war would require a common basis both from the point of view of public law and also of politics. No such basis exists, seeing that the Austrian State, which has arisen out of the dismemberment of the Austro-Hungarian Monarchy, and which was forcibly created by the Treaty of St. Germain-en-Laye, did not exist before the war.

But if the traffic of the Austrian Republic is compared with that of the Austrian part of the former Austro-Hungarian Monarchy, no greater contrast can be found than that subsisting between the former State, whose organisation was based on a solid foundation of age-long development under sound economic conditions, and the State formed by the Treaty of St. Germain—a State whose economic impotence, so emphatically but fruitlessly predicted by the Austrian Peace Delegation, has, during the two years of its existence, been proved in a more clear and more terrible fashion every day.

Such, then, were the economic conditions to which the system of communications in the former Austrian State was adapted. The railway policy of the former Austria had aimed at establishing, by the creation of a good communications system, a balance between the producing and consuming regions of the Empire, at directing farming and mining products—particularly coal—towards the great consuming centres and the industrial factories, and making possible vast commercial activity between Austria and the neighbouring States. For this purpose a railway system was conceived in the form of a series of lines running north and south, establishing connections between the regions of Bohemia, Moravia, Silesia and Galicia—regions rich in farming and mining products—and the Alpine countries, which are almost devoid of these products ; all these lines converged on the great consuming centre, the capital, Vienna, and at the same time connected this age-long centre of European commerce with the chief places on the frontier and, beyond the frontier, to the great German seaports, with which the Monarchy carried on extensive commercial relations. While the railways running from west to east, and the great navigable waterway, the Danube, provided means of transit from the countries of Western Europe to the Balkans, the lines running South—the carrying capacity of which had considerably increased at the beginning of the present century owing to the construction of a second line towards Trieste— conveyed the products of the local industries (which were in a high state of development, particulary in the country of the Sudetes) to Trieste, the only commercial port belonging to Austria. It was partly due to the excellence of her railway system, which was adapted to meet the peculiar economic needs of her territory, that the former Austrian State owed its reputation as a country capable of rivalling the other economically important States and became recognised by them as a competitor.

With the dissolution of the Austro-Hungarian Monarchy, this territory, which was an economic entity, was arbitrarily dismembered, without any reference to previously existing economic relationships. The new Austria is nothing more than a poor mountainous country whose farm produce scarcely suffices to support its population of about six millions for three months in the year, and which cannot even produce, within its own territory, one-tenth of the coal which it requires. Moreover, the country is badly provided with raw materials, and the little which remains cannot, owing to lack of coal, be used for manufacturing purposes.

With this destruction of the unity of Austria's economic territory was coupled the destruction of her railway system. In this process great attention was paid to the political, strategic, and economic desires of neighbouring States, but the vital interests of the Austrian State were neglected, and our railway system was in consequence mutilated so as to prevent these lines from being worked in such a way as to satisfy the requirements of traffic and our economy needs. Of the numerous railways which deal with the traffic from the frontiers to Vienna and beyond, only the lines running trom west to east (Buchs and Lindau-Vienna, and Salzburg and Passau-Vienna) have remained unaffected by the alteration of the frontiers, and have thus remained intact. But these lines cross districts which, owing to their natural conditions, are of inferior value as regards farming and industrial produce, and which are of no importance except for international transit. Moreover, they are mountain railways, the operating of which is particularly costly. Of all the other main traffic routes—particularly those running north and east—only worthless fragments, varying in length from 41 to 164 km., remain in possession of the new Austria. These are the sections of the main lines which worked the traffic as far as the frontiers of the former Austria, via Gmund, Znaim and Grussbach to the north-west, and via Lundenburg to the north and north-east. These lines have now been so mutilated by the fixing of the frontier that all the above-mentioned stations, (which are, moreover, the first of any importance after leaving Vienna, and which are provided with the equipment and plant necessary at exchange stations, are situated in foreign territory and are therefore no longer under Austrian administration. The same holds true of the State railways and of the Sudbahn, which runs southwards. These lines have been cut off by the frontier immediately before the important junction stations of Tarvis, Assling, Unterdrauburg and Marburg, which were equipped for this purpose. As a result of the loss of these stations, all the Austrian sections of these important lines are left without transit stations situated in their own territory, and suitable,—on account of their position, plant and equipment—for carrying out the systematic collection and distribution of goods when they arrive, in accordance with the requirements and interests of our traffic and our economic system.

The consequence of the unnatural delimitation of the frontier, which arbitrarily destroys the economic entity and the unity of technical working, not only prejudices the interests of Austria, but also forms an insurmountable obstacle to the development of traffic on the Austrian railways.

On the Sudbahn, the frontier of Austria, as fixed by the terms of the Treaty of Peace, has brought about a chaotic situation. By means of two lines running north and south (Vienna-Trieste (Munich) and Kufstein-Ala (Venice), which are united by the line from Marburg to Franzensfeste, this railway system connected two important centres for European traffic directed towards the Adriatic Sea. Without taking into consideration the important economic interests which it is called upon to serve, this system has been broken into several sections, each under a different administration. Thus, the most important line—Vienna to Trieste—is composed of an Austrian, a Jugo-Slav and an Italian section. Each of these sections applies a different scale of rates, published in the language and reckoned in the currency of the State in which the section lies. The same holds good on the line from Marburg to Franzensfeste, which formerly served the traffic between Hungary and the Balkans and also between South Germany and Switzerland. This line has been broken into three sections, and the traffic, which was formerly very heavy, has now given place to insignificant local traffic.

Finally, the second Sudbahn line, running from north to south, from Kufstein to Ala, has been cut in two by the frontier. The transit from one system to the other has to be made high up in an Alpine pass, subject in winter to the most unfavourable climatic conditions.

Similarly, the dismemberment of the Northern railway from Vienna to Oderberg is gravely prejudicial both to the interests of Austrian traffic and trade and also to international traffic. The chief object of this line was always to serve the direct traffic from north to south, particularly the coal traffic. The former Austrian State recognised the importance of this line, which was intended for special traffic, and which represented an independent organisation. The Northern railway was purchased, and, notwithstanding its incorporation in the railway system of the Austrian State, the latter formed it into a special organisation, with its own balance sheet, for the purpose of assuring connections between its various lines. At present this line is composed of three sections, the northern part of which has passed into the hands of Poland, the central and largest part to the Czecho-Slovak State, while the section Vienna–Bernhardstal (the length of which does not exceed 76 km.) has been allocated to Austria.

Owing to this dismemberment, each of these three trunk lines has lost importance in its own territory for its own national State, for the fixing of the frontiers of the national States (which extend chiefly from west to east) has created, for political national reasons (especially in Czecho-Slovakia and Poland), a desire to give preference to other lines more useful, from an internal point of view, within each of these new States. The former main railway line of the monarchy has been neglected by these new States and has thus lost in importance. Its value to international traffic, however, has increased as a result of the political changes, and, once normal economic relations are restored, it can be of service to a yet larger number of States. It is essential for Austria that there should be an international administration of the traffic on this line, binding upon all the interested States. It is only through such a solution that Austria will be able to find a satisfactory guarantee for the unhindered transport of coal from the Silesian mines, which forms an indispensable condition of the existence not only of her railways, but of her whole economic life. The sad events of the last two years following the dissolution of the Austro-Hungarian Monarchy (during which the supply of coal from Czecho-Slovakia and Poland either ceased entirely or diminished to such an extent that the Austrian railways were compelled on several occasions to suspend traffic for weeks at a time, or to limit it drastically), constitute the most convincing argument for rendering Austria as far as possible independent of the neighbouring States in respect of her supplies of foreign coal.

The difficulty in re-establishing a direct and mutual traffic between railways cut through by the new frontiers — a difficulty which particularly affects international traffic — is rendered sufficiently evident by the fact that at least 15 such frontier points will have to be made the subject of agreements with the new States in respect of the working of railway junctions. Austria will from the outset enter upon these negotiations under disadvantageous conditions, owing to the fact that the new frontiers, wherever they cross the old through-routes, have without exception been fixed in such a manner that the nearest stations which are suitable, on account of their plant and equipment, for transit and changing operations, are on foreign territory and therefore beyond Austrian control. Any consideration given to Austrian interests will depend therefore in each case on the goodwill of the other party — a goodwill which, as experience has hitherto shown, will not always be forthcoming. It is therefore probable that in many cases an appeal to the arbitrator provided for under Article 319 of the Treaty of St. Germain will be inevitable. Our railway system is thus absolutely deprived of natural outlets. It depends almost entirely on foreign countries for its coal supply, so that the very possibility of working is uncertain, owing to the interruptions in the delivery of supplies which have been contracted for, and owing to transport hindrances on foreign railways ; and yet it is on this system that the Treaty of St. Germain has imposed heavy burdens in the form of unilateral obligations in respect of most-favoured-nation treatment and other privileges.

Our freedom to adopt a tariff and commercial policy — a freedom possessed by every civilized State and only renounced voluntarily on terms of complete reciprocity such as are provided for in a treaty — is denied to us by intolerable restrictions which prevent us from taking the measures in the field of tariff and commercial policy which are essential for the development and rebuilding of our shattered economic life.

By the loss of her coast-line, Austria has been completely cut off from maritime navigation. As regards navigation on the Danube, Austria has lost her predominant position in the Danube traffic — a position represented by the great enterprises of State navigation — and she has fallen to the level of an unimportant river State whose sphere of influence is limited to a Section of the Danube which is commercially of little importance.

Austrian transports have shared the economic ruin of the whole Austrian State. The dismemberment of her railway system, the incessant lack of coal and her heavy international obligations weigh so heavily upon Austria that she cannot anticipate any restoration of her transport system ; the same fate is overtaking the whole life of the Austrian State which was created by the Treaty of St. Germain, and which was in a similar way condemned to economic death.

The communication system of such a State could not be compared to an organisation such as that of the former Austrian State, which was founded on sound economic bases, and was capable of development.

With these reservations, we submit, for purposes of information, a statement drawn up in accordance with the scheme.

I

RAILWAYS

A. Material.

1. *Length of the Austrian Railways.*

	Austrian Empire in 1913. Kilometres.		Republic of Austria 1920. Kilometres.	
Length of railway lines constructed (excluding light railways, various rack railways, tramways, funicular railways, etc.).	22,880		6,326	
Worked by the State.	18,879		4,290	
Worked by private enterprises. . .	4,001		2,036	
Lines worked by the State.	18,879		4,290	
Directly	13,837		3,478	
Indirectly.	5,042		812	
The whole of these lines include the following :	22,880		6,326	
Main lines.	13,891		3,882	
Local lines.	8,989		2,444	
Lines with two or more tracks.. .	3,645	(15.9%)	1,518	(24.0%)
Narrow-gauge lines.	1,457	(6.4%)	785	(12.4%)

2. *Condition of the Lines.*

The condition of the lines greatly deteriorated during and after the war. In spite of the difficulties — which nevertheless were only surmounted at the cost of great effort — such repairs as were indispensable for safe working have been carried out. These repairs were rendered all the more difficult and costly because the Austrian railways are, for the most part, mountain railways, and therefore require the utmost care for the maintenance of the permanent way and superstructure.

The curves and gradients of the lines worked by the State were as follows :

Curves.

The total length constructed comprises :

Straight track	62.0 %
Curves up to 1,000 metres radius	5·5 %
From 1,000 to 500 metres radius inclusive	9.4 %
» 500 to 400 » » »	4.1 %
» 400 to 300 » » »	8.8 %
» 300 to 200 » » »	8.6 %
» 200 to 100 » » »	1.6 %

Gradients.

On the level	17.0 %
Slopes and gradients up to 1 %	4·7 %
From 1 % to 2.5 % inclusive	14.2 %
» 2.5 % to 5·0 % »	21.0 %
» 5·0 % to 10.0 % »	22.4 %
» 10.0 % to 12.5 % »	4.8 %
» 12.5 % to 16.7 % »	6.4 %
» 16.7 % to 25.0 % »	6.1 %
» 25.0 % to 23.3 % »	2.8 %
» 33·3 % to 50.0 % »	0.2 %
» 50.0 % »	0.4 %

At present certain sections demand more extensive repairs, particularly as regards the track, but there are not, however, many of these sections. To meet the needs of future international traffic, a good deal of work on the track and superstructure will need to be accomplished in the course of the next few years, in view of the fact that, owing to the lack of necessary funds and to the difficulty of obtaining material both during and since the war, all repairs which were not absolutely indispensable for safe working have necessarily been postponed, including nearly all works for the purpose of increasing the carrying capacity of the railways in respect of axle loads and speed.

The damage directly caused by the war has already been repaired so as to render possible the regular working of all the lines. Some of this damage has not yet been finally repaired, especially on the Klagenfurt-Rosenbach line and on the portion of the main line of the Sudbahn situated in Carinthia.

3. *Improvements.*

The new delimitation of the Austrian frontiers makes it necessary to enlarge the Austrian railway stations, which are destined to serve as frontier stations, in conformity with agreements made with the adjacent countries: Czecho-Slovakia, the Serb-Croat-Slovene State, Italy and Hungary. In order that these stations may meet the requirements of transit and frontier services, it will be necessary to undertake some fresh construction works and to effect other improvements.

Again, the disruption of the economic unit represented by the former Austria into a number of independent organisms has led to modifications in the policy adopted in matters of commerce and traffic in these States, so that traffic will now develop over new lines, which will have to be adapted to meet the new conditions, so that their capacity may be in proportion to traffic requirements.

The urgent necessity of repairing the rolling-stock — these repairs having been neglected during the war owing to the lack of material and labour — makes it necessary to develop the workshops of the State railways with a view to increasing their output.

The States which were formed out of the fragments of the Austro-Hungarian Empire, or to which portions of its territory were ceded, dismissed a large number of former employees of the Austrian State railways on the ground of their German nationality. These persons came into the territory of the Austrian Republic; the provision of accommodation for them involved relief work on a large scale by the housing authorities, the difficulty being all the more acute because there was a very serious lack of dwellings in all parts of Austria, owing to private building having been suspended during the war.

During the war — *i.e.*, for nearly five years — and even during the years which followed it, it was found impossible to improve the railway system in a manner corresponding to the requirements of passenger and goods traffic. The works undertaken with this object before the war have, for the most part, had to be postponed.

In view of the present fabulous price of labour and building materials — which are now fifty or sixty times above the pre-war prices — and in view of the deplorable situation of the Austrian State finances, there is little probability of the work projected being carried out in the near future, particularly as the expense (which is in proportion to the reduced length of the system *i.e.*, one—quarter of the sum allotted for the former system) would amount to about two milliard crowns, making allowance for the decreased value of our money.

At present it is not easy to see how the Austrian State is to provide means even for indispensable construction work, for the development of new frontier railway stations, and for increasing the capacity of certain lines, which will acquire great importance owing to the new traffic orientations.

The same reasons will, for a considerable time, prevent the execution of an extensive programme for the construction of new lines, which had been drawn up before the war, but which has not been carried out.

4. *Electrification.*

On the other hand, the Austrian State Railway authorities are seriously considering a scheme by which they hope to effect a considerable improvement in the difficult situation in which the working of these railways and their whole economic system is at present involved owing to the lack of coal. This scheme consists in the electrification of the State Railways.

As has already been pointed out, the fixing of the frontiers of Austria deprived her of political control over the coal districts, and rendered her, for all time, completely dependent on foreign countries as regards her coal supply. The desire to alleviate the extreme hardships under which the traffic of the new State laboured from the very first months of its existence, led to a conviction that one of the most urgent tasks, from the point of view of economy, was to replace the system of steam traction on the Austrian railways by electric traction, making use of natural forces, *i.e.*, water-power. Accordingly, at the beginning of 1919, the Austrian Government commenced preparatory works with a view to the electrification of the State railways. It was proposed to begin by the conversion of the Arlberg line, which is specially adapted for electrification, owing to the heavy traffic it carries, its steep gradients, and the large reserves of water-power available in its district.

The first step towards the realisation of this scheme of electrification was the law on " The Introduction of Electric Traction on the State Railways of the Austrian Republic ", which was passed in July 1920.

This law provides for the electrification, within a period of construction of five years, of the Salzburg — Innsbruck — Brégenz — Buchs railway, which is one of the lines carrying the heaviest traffic in the direction from west to east; the next line to be converted was the Schwarzach—St. Veith—Spittal—Millstattersee section of the Tauern railway in the direction from south to north ; and next the Salzkammergut railway from Steinach—Irdning to Attnang-Puchheim. The electrification of the Salzburg—Brégenz line will be followed by that of the Vienna—Salzburg line, in order that the whole traffic route from east to west may be worked as soon as possible by electric traction.

It was decided to begin with the Arlberg line, because the coal for that line has to be carried over the longest distance, so that the reduction in the cost of traction will be very considerable. It is to be hoped that it will be possible to institute electric traction on the line west of Innsbruck early in 1922, and that this form of traction will be in force on the whole Arlberg line at the beginning of 1923.

5. *Rolling-stock.*

I. *Situation before the War.*

(Entire Railway System of the Austrian Empire.)

	State Railways.	Private Companies.	Total.
Locomotives	6,192	1,333	7,525
Passenger coaches	12,255	2,868	15,123
Mail vans and service wagons	4,466	884	5,350
Closed goods trucks	45,077	9,500	54,577
Open goods trucks	66,992	24,236	91,228
Tank wagons	377	5	382
Total	129,167	37,493	166,660

II. *Present Conditions.*

(Railways of the Austrian Republic.)

A. Originally acquired.

	Locomotives.	Wagons.
Stock purchased by the State railways	140	3,415
Wagons hired by the State railways		290
Wagons privately owned but incorporated in the stock belonging to the State railways		1,670
Total A.	140	5,375

B.—Portion assigned to Austria out of the pool of locomotives and wagons of the former Imperial and Royal Austrian railways, of the Royal Hungarian State railways, and of the former Imperial and Royal Military railways.

The rolling-stock in the possession of the Imperial Royal Austrian railways, the Royal Hungarian State railways, and the former Imperial and Royal military railways, at the time of the dissolution of the Austro-Hungarian Monarchy, consisted of :—

12,300 Locomotives.	24,500 Passenger coaches.
	8,500 Mail vans and service wagons.
	110,000 Closed trucks.
	140,000 Open trucks.
	283,000 Vehicles in all. [1]

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[1] The final number of these wagons will depend on the requisitionment of wagons, according to their distinguishing numbers, which, in accordance with the wishes of the allocation Commission, was carried out in all States formerly part of Austria-Hungary on Sept. 11th, 12th and 13th 1920; exact statistics are not yet available.

This total will be allotted by the Allocation Commission, established by virtue of Article 318, para. 3, of the Treaty of St. Germain, to the various States forming part of the former Austro-Hungarian Monarchy.

	Locomotives	Wagons
Austria has definitely received from this source,	935	
and out of a total of 54.736 wagons distributed up to now		11,409
Total B.	935	11,409
In consequence, the Austrian State railways now possess a total (A + B) of	1,075	16,784

In addition to these, there are still 1,225 locomotives formerly belonging to the Imperial Royal Austrian railways which have not yet been definitely distributed.

This total of 2,300 locomotives barely suffices for the needs of the Austrian State railways.

Including the principal railway companies, Austria has about 2,900 locomotives at her disposal.

B. TRAFFIC.

1. *Running of Trains.*

Passenger traffic on the Austrian State railways. Present conditions compared to those prevailing prior to the war and to the period immediately following it.

(See following pages.)

I. Express Trains.

a) International Express.

The Summer time-table for 1914 (before the war) contained the following services (in both directions).	Period immediately following the war.	The present time-table (January 1921) contains the following services (in both directions).
One daily " train de luxe " (Orient Ostend-Express) : Constantinople and Bucarest - Budapest - Vienna - Wels. From this point one section *via* Salzburg - Munich - Strasburg, to Paris, another *via* Passau - Frankfort-on-Main to Ostend and Holland.	Immediately after the war all international passenger traffic was completely suspended.	One " train de luxe " three times per week : Vienna - Salzburg - Munich - Strasburg - Paris.
Two express trains daily : Vienna-Selzthal-Innsbruck-Buchs-Zurich-Bâle-Paris.	The only international express train running was the " Military Entente Train " which was used exclusively by the Entente, and which merely crossed Austria : Paris - Zurich - Innsbruck - Vienna - Lundenburg - Oderburg-Warsaw with a branch line from Linz *via* Summerau to Prague.	One through train three times per week : Vienna - Salzburg - Innsbruck - Buchs - Zurich - Bâle - Paris.
One daily express train : Vienna-Salzburg-Innsbruck, with through connection at Salzburg for Munich.		One express train three times per week : Vienna - Salzburg - Innsbruck, with through connection at Salzburg for Munich.

Three daily express trains : Vienna - Salzburg - Munich - Southern Germany.	One express train three times per week : Vienna - Salzburg, with through connection for Munich.
Two daily express trains : Vienna - Passau - Nuremberg - Frankfort-on-Main - Cologne.	One daily express train Vienna - Passau - Ratisbon - Leipzig - Berlin.
One daily express train : Vienna (Western Station) - Selzthal - Villach - Pontafel - Rome.	One through train three times per week : Vienna - Passau - Nuremburg - Frankfort-on-Main - Cologne - Holland and Ostend.
One daily express train : Vienna (Southern Station) - Leoben - Villach - Pontafel - Rome.	One express train three times per week : Vienna (Southern Station) - Leoben - Villach - Tarvis - Rome - Trieste.
One daily express train : Vienna (East Station) - Budapest - Belgrade - Sofia - Constantinople.	One through train three times per week : Vienna (Southern Station) - Leoben - Villach - Tarvis - Venice - Trieste and Rome.
One daily express train : Vienna (East Station) - Marchegg - Budapest - Bucarest.	One through train three times per week : Vienna (East Station) - Budapest.
Six daily express trains : Vienna (North Station) - Cracow - Poland - Galicia and Russia.	One through train three times per week : Vienna (East Station) - Budapest - Bucarest.
Two daily express trains : Vienna (North Station) - Brunn - Prague - Bodenbach - Dresden - Berlin.	

a) International Express. *(Continued.)*

The Summer time-table for **1914** (before the war) contained the following services (in both directions).	Period immediately following the war.	The present time-table (January **1921**) contains the following services (in both directions).
One daily express train : Vienna (East Station) - Brunn - Prague - Carlsbad - Dresden - Berlin.		One through train three times per week : Vienna (North Station) - Lemberg and Warsaw.
One daily express train : Vienna (North Station) - Iglau - Teschen - Dresden - Berlin.		
One daily express train : Vienna (Francis-Joseph Station) - Prague - Berlin.		One daily express train : Vienna (Francis-Joseph Station) - Prague - Berlin.
One daily express train : Trieste - Linz - Prague - Berlin.		One express train three times per week : Trieste and Agram - Linz - Prague.
Four daily express trains : Munich - Salzburg - Villach - Trieste.		One express train three times per week : Munich - Salzburg - Tarvis - Trieste.

b) Express Trains (Internal Services).

One weekly express train : Vienna (West Station) - Aussée - les - Bains.	After the end of the war it was found possible to run a few express trains (internal service only) several times a week on the two principal lines of new Austria, *i.e.*, Vienna (West Station) - Salzburg - Innsbruck - Bregenz and Vienna (South Station) - Leoben - Villach - Tarvis. Some months later, however, especially during the winter of 1919-1920, the want of coal became so great that all express trains were suspended.	
Two daily express trains : Vienna-Salzburg.		
One daily express train : Vienna-Selzthal-Innsbruck-Lindau.		One express train three times per week : Vienna - Salzburg - Innsbruck-Bregenz.
One daily express train : Salzburg-Innsbruck-Lindau.		
One daily express train : Prague-Salzburg.		
One daily express train : Selzthal-Linz-Budweis-Prague.		
One daily express train : Wels-Passau.		
Three daily express trains : Attnang - Pucheim - Aussée-les-Bains.		

b) Express Trains (Internal Services). *(Continued).*

The Summer time-table for **1914** (before the war) contained the following services (in both directions).	Period immediately following the war.	The present time-table (January **1921**) contains the following services (in both directions).
One daily express train: Attnang-Pucheim-Ischl-les-Bains.		
One daily express train : Prague-Linz-Salzburg - Tauern - Villach Railway.		
One daily express train : Innsbruck-Feldkirch-Buchs and Bregenz.		
Two daily express trains : Vienna (North Station) - Lundenburg-Brunn.		
One daily express train : Vienna (East Station) - Budapest *via* Bruck-on-Leitha.		

Three daily express trains : Vienna (East Station) - Budapest via Bratislava.		
One daily express train : Vienna (North-West Station) Iglau- Nimburg-Reichenberg.		
Two daily express trains : Vienna (Francis-Joseph Station)-Prague-(Francis-Joseph Station).		
Three daily express trains : Vienna (Francis-Joseph Station) Gmünd-Pilsen-Eger and Carlsbad.		

II. Direct Trains.

direct trains		
line : Vienna-Linz . . . . 6.	Immediately after the war it was found possible for several months to run, on an average, two direct trains in either direction on the main lines. Soon, however, the lack of coal became so serious that by the end of 1919 these trains could only run three times a week, being later further reduced to two a week. During the winter 1919/20	2 direct trains.
line : Linz-Salzburg . . . . . . 7.		3 » »
line : Salzburg-Innsbruck . . . 4.		2 » »
line : Innsbruck-Lindau . . . . 4.		2 » »
line : Amstetten-Bischofshofen 5.		2 » »
line : Summerau-Linz. . . . . . 4.		2 » »

II. Direct Trains. *(Continued.)*

The summer time-table for 1914 (before the war) contained the following services (in both directions).	Period immediately following the war.	The present time-table (January 1921) contains the following services (in both directions).
direct trains		
line : Linz-Selzthal . . . . . . 5.	coal supplies failed completely, so that passenger traffic had to be stopped for several weeks.	2 direct trains.
line : Selzthal-St.-Michael . . . 6.		2 » »
line : Wels-Passau . . . . . . 5.		2 » »
line : Attnang-Stainach-Irdning 7.		2 » »
line : Schwarzach–St.–Veit–Rosenbach . . . . 4.		2 » »
line : Leoben-Villach-Tarvis . . 5.		I » »
line : St.-Veit-Klagenfurt-Assling 5.		2 » »
line : Vienna (East Station) Bruck-on-Leitha (Budapest) . 3.		2 » »
line : Vienna (East Station) Marchegg-Budapest . . . . . . 3.		I » »

line: Vienna (North Station)-Lundenburg (Poland) . . . . 6.		0 direct trains.
line: Vienna (North Station)-Lundenburg (Brunn) . . . . 3.		2 » »
line: Vienna (East Station) Grussbach (Brunn) . . . . . 3.		0 » »
line: Vienna (North-West Station)-Znaim (Teschen) . . . 4.		2 » »
line: Vienna (Francis-Joseph Station)-Gmund (Prague and Eger) . . . . 4.		3 » »

2. Summary of Passenger Trains per Day (kilometres).

	July 1914		January 1919	January 1921
	Austrian Empire	Austrian Republic		
Express trains	558,564	31,425	1,055	3,038
Through trains	1,914,963	73,830	19,137	31,973
Total.	2,473,527	105,355	20,192	35,011
Comparing the above figures for the last pre-war year on the territory of the present Austrian Republic with those of January 1919 and 1921			19 %	34 %

3. *Tonnage of Goods.*

Goods carried on the State-owned and State-operated lines.

Financial year	Goods.				Total.	
	By fast trains.		By slow trains.			
	Tons.	Kilometric tons.	Tons.	Kilometric tons.	Tons.	Kilometric tons.
1913. Total system of former State Railways	1,140,768	148,804,029	84,686,196	12,161,468,483	85,826,964	12,310,272,512
1918-19 } State Railways of the Austrian Republic	300,856	33,228,705	15,120,290	1,979,039,650	15,421,146	2,012,268,355
1919-20 }	203,812	12,179,421	14,120,311	1,706,803,337	14,324,123	1,727,182,758

Statistics are still lacking for similar information concerning privately-owned railways.

C. RATES.

Increase of Charges on Passenger and Goods Services.

In order to remedy the disproportion between the working receipts and expenditure, which is continually increasing (it had been noticeable during the war and still more so since the war) and which was due partly to the restriction of traffic, and partly to the sudden leap in expenditure on personnel, and the excessive increase in the cost of all material, the authorities of the Austrian State Railways have been obliged, on several occasions, to increase the charges both on goods and passenger traffic, in order as far as possible to balance receipts and expenditure.

1.—*Goods Service.*

A.—*List of Rates imposed by the Imperial Royal Austrian Railways during the War*

February 1, 1917 : Increase of 30 % on all existing goods rates.

January 1, 1918: Increase of 50 % on rates for fast trains, 1st class fares, and single parcels, followed by a fixed addition to goods rates (supplement for working charges) ; finally a revision of the general table of rates on goods traffic, thereby transferring a large number of articles to higher categories in the scale of rates.

September 1, 1918 : Increase of 40 % on coal rates and of 70 % on rates for all other articles, followed by the replacement of the "Supplement for working charges" by a fixed supplement slightly reduced in amount.

B.—*List of Rates on the Railways of the Austrian Republic.*

October 15, 1919 : Increase of 150 % in all categories of goods.

January 1, 1920 : Incrase of 150 % in all categories of goods.

April 15, 1920 : Increase of 100 % in all categories of goods.

October 15, 1920 : Introduction of new rates (provisional rates) drawn up on a new basis in order to assimilate all rates, without materially augmenting the financial returns.

December 15, 1920 : Increase of 50 % of the rates of the revised goods scale with the exception of those covering foodstuffs and raw materials Moreover, since the beginning of the war, about 60 exceptional rates, (including all the export rates) have been suspended. Reductions of rates granted on certain special articles have been suspended. These steps have resulted in an average increase of 6,000 % on the 1914 rates.

2.—*Passenger and Luggage Services.*

A.—*List of Rates introduced by the Imperial Royal Austrian Railways during the War.*

February 1, 1917 : Increase of about 30 % on rates for luggage and passengers.

December 1, 1917 : Increase of 50 % on rates for luggage and passengers.

B.—*List of Rates introduced by the State Railways of the Austrian Republic :*

May 5, 1919 : Increase of rates by 50 % on passenger traffic for third-class passengers, 66⅔ % for second, and 100 % for first ; increase of 50 % on luggage rates.

November 15, 1919: Revision of passenger and luggage rates. The following increases in prices ensued : for third-class slow trains about 50 %, for second and first class about 80 %, for express trains, third class, about 80 %, and in the second and first classes about 115 %. The increase in the rates for luggage on slow trains was about 85 %, and for luggage on express trains about 178 %.

January 1, 1920 : Increase of 50 % in passenger rates and of 150 % in luggage rates.

April 15, 1920 : Increases of 50 % in passenger rates and of 100 % in luggage rates.

These increases on passenger and luggage rates compare as follows :

Third class, slow trains	929 %,	express trains	1,069 %
Second » » »	1,209 %,	» »	1,388 %
First » » »	1,500 %,	» »	1,718 %
for luggage » »	2,400 %,	» »	3,650 %

The data for the Austrian State railways hold true in a general way for the privately owned railways, as the latter generally follow the example of the former as regards rates.

D. Fuel

The railways included in the territory of the Austrian Republic use, and have always used, coal (sometimes in the form of briquettes) as their principal form of fuel ; mineral oil being only used to a limited extent on certain mountain lines where there are numerous tunnels.

The railways of the former Austrian Empire were in a position to obtain the greater portion of the fuel they required from local sources.

For instance, the State railways obtained 84 % of their fuel from the Austrian mines, only the remaining 16 % coming from the mines of Upper Silesia and from England.

The deliveries being effected on a contract basis, it was easy at the time of delivery to ascertain that the coal supplied was of good quality. In this way it was possible to be satisfied with proportionately small quantities.

In those days 2,504,000 tons sufficed for working lines corresponding in extent to the present system of the Austria Republic, whereas today 3,786,000 tons are needed for the same distance, on account of the falling off in quality.

The pitheat prices were :

for lignite obtained from Bohemia	13.40	crowns per ton
for coal obtained from Upper Silesia	19.08	» » »
for coal obtained from Ostrau	17.30	» » »

After the disruption of the former Austrian State, the supply of coal was seriously affected by the loss of those districts which had till then supplied this fuel, particularly as the supplies coming from foreign coal-fields—such as Czecho-Slovakia, Germany, and Poland—were at that time completely suspended.

The negotiations which were immediately opened with Czecho-Slovakia and Germany only resulted in providing an extremely reduced supply, which was inadequate to meet the needs of the traffic.

The prices of coal, estimated at the pithead, then were :

for lignite from Bohemia	92.00	crowns per ton
for coal from Upper Silesia	136.57	» » »
for coal from Ostrau	59.00	» » »

Since then, the conditions for the supply of coal have certainly somewhat improved. During the year 1920, the consignments for the railways—though still, indeed, too small—have at any rate been moderately satisfactory, although irregularities of transportation have occasioned difficulties in delivery.

The coal consumed by the Austrian railways amounted in 1920 to about 2,400,000 tons.

This quantity may be classified, as regards its origin, as follows :

41 % from the lignite fields of Czecho-Slovakia (Brux, Teplitz, Komotau and the Falkenau Basin).
11 % from the Ostrau coal-field.
36 % from the coal-fields of Upper Silesia.
12 % from the home coal-fields.

At the end of December the prices, estimated at the pithead, were as follows :

For lignite obtained from Czecho-Slovakia, 135.78 Czecho-Slovak crowns per ton ;

For Ostrau coal, 424.00 crowns per ton ;

For Upper Silesian coal, 304.00 marks per ton ;

For home-produced coal from Traunthal, 917.40 Austrian crowns per ton ;

For lignite from Graz-Koflach, 889.29 Austrian crowns per ton.

The consumption corresponds to the reduced requirements of the traffic, which is still very limited and entirely inadequate.

In order to increase the traffic, so as to correspond to present requirements, a considerable increase in the deliveries of foreign coal would be necessary ; all the more so because the amount of fuel consumed per kilometre has risen appreciably in comparison with the pre-war returns ; this is no doubt because the quality of the coal is so much inferior to that of the coal used before the war.

E. GENERAL FINANCIAL SITUATION OF THE RAILWAY SYSTEMS.

In the last years before the war, the Austrian Empire had resolutely carried out the policy which it had pursued for twenty years with regard to the purchase of private railways, so that at the time of its dissolution, nearly all the important private railways, except the Sudbahn and the railways of the coal district in Nord-western Bohemia, were already in possession of the State. Although these purchases affected the territory of the Austrian Republic less in proportion than that of the other States formed by the Treaty of Peace, nevertheless the State railways are so much the more important (though their extent is scarcely a quarter of that of the former Austria), that their financial situation may be taken to represent that of all the railways of Austria. The data given below are, therefore, only concerned with the finances of the State railways.

	1913	1919/20	1920/21
	State Railways of the Austrian Empire	State Railways of the Austrian Republic (Figures from Budget)	
Length operated in kilometres	19,289	4,478	4,478
	Millions of crowns.		
Receipts from working the lines	887	1,759	5,115
Expenditure of working the lines	691	1,940	8,599
Profit on working the lines	196	—	—
Loss from working the lines	—	181	3·448
Sums required for payment of interest and for amortisation of invested capital . .	247	65	105
Additional sums, taken from other revenues of the State, to cover the deficit of the State Railway (Supplementary contribution of the State)	51	247	3,589

The conditions were never very favourable for obtaining good returns from the Austrian State Railways. In the first place the difficulties of the ground, due to the orographical and hydrographical situation of the Empire, —the greater part of which has the characteristics of a mountainous country— presented obstacles to the construction of most of these railways, owing to the great differences of altitude in the country traversed. The track had to be carried over Alpine passes or through narrow gorges, which imposed extremely difficult tasks on the Austrian railway engineers, in which, however, they were completely successful. These characteristics of the task involved the construction of a great number of artificial works : tunnels, bridges, viaducts, embankments, cuttings, and works for strengthening slopes, in order to avoid avalanches and landslips, with the result that the capital sunk in the line was abnormally large, and that the railway was burdened with heavy expenses for upkeep and working ; a profitable exploitation of the lines was then difficult. In addition, numerous lines were constructed with the object of improving conditions in relatively unproductive districts, situated too far from the main routes of traffic to be able to dispose of their produce by connecting them with the existing traffic routes and stimulating their productivity. Until these measures had been able to produce their effect no large returns could be looked for from these lines.

It is to these special conditions of construction that the relatively low returns from the Austrian State Railways must be attributed. Although, before the war, their receipts were sufficient to cover their working expenses, they have never been able to yield sufficient profit to meet the charges for interest and amortisation of invested capital ; for this purpose more or less considerable subsidies had to be provided out of other forms of State revenue.

Enormous expenditure was incurred, especially during the last years previous to the war, in carrying out considerable improvements in the engineering works and structures and in the rolling-stock of the recently purchased railways which traverse Bohemia, Moravia and Galicia, and lead to the North-Western, Northern and North-Eastern frontiers ; the same applies to the construction and establishment of the second line of railway communication with Trieste, where, in the section Tauern, Karawanken and Wochein, enormously difficult and costly engineering work has been carried out.

By economic working it has nevertheless been possible to increase annually the yield of the State Railways, so that in 1913 the above, mentioned subsidies, which in 1909 had already reached the considerable sum of 114,000,000 crowns, was reduced to 51,000,000. It was therefore permissible to look forward to a better financial future for the former Austrian State Railways.

On the other hand the financial situation of the Republican State Railways is desperate. Of the former railway system—barely a quarter of which (4,478 km. of 19.289 km.) has remained in the possession of the new State—the most productive lines, which had developed rapidly during the years before the war, and, at the cost of considerable sacrifices, even during the war, have become the property of the Succession states. The lines still belonging to Austria, of which the terminal stations are at Vienna, are, on the other hand, overburdened with excessive capital expenditure on construction and with a complicated and costly system of working, owing to the fact that they cross unproductive mountainous regions and are, therefore, unprofitable to operate ; the considerable expenditure incurred through the construction, upkeep, and operation of these terminal stations was formerly off-set by the total yield of the important routes which started there ; but at the present time this expenditure is out of all proportion to the meagre fragments of lines which are all that remain to Austria. Similiarly, Austria retains the central offices of administration of these formerly important routes (which have now been so much shortened by the fixing of the new frontiers), and she also retains the great number of employees necessitated by the former extensive administration, and who now cost the State large sums of money which cannot be covered by receipts from the present restricted railway system.

Finally, the administration of the Republic State Railways found itself obliged to make use of thousands of employees who had had to leave the territory of the States formerly part of the Austrian Empire, and whose case has been referred to above. These circumstances explain the extraordinary expenditure incurred by the Austrian State Railways on account of staff, an expenditure which is disproportionate to the length of the lines under operation. Owing to the continual depreciation of our money and to the continuous rise in the cost of living, the administration of the State Railways has also on several occasions been obliged to increase the wages of the employees ; this also has been a very heavy item, although the wages paid do not exceed the amount necessary for the barest requirements of life.

Whereas expenditure on personnel on the former State Railways, which had an extent of 19,000 kilometres, amounted in 1913 to 421,000,000 crowns, the 1919-20 Budget of the Austrian Republic provides for an expenditure of about 4,700,000,000 in wages, although the system is so much smaller. This is a provisional estimate and is certain to be exceeded.

The increased cost of material is equally alarming ; this expenditure, which in the last year before the war amounted to 270,000,000 crowns on the Imperial and Royal Railways, has now reached a total of about 3,850,000,000 on the State Railways of the New Austria. In this connection it must especially be borne in mind that the material of which the largest quantities are consumed—especially coal and oil—comes, for the most part, from foreign countries ; the price of these materials is consequently very unfavourably affected by the depreciation of our money.

Whereas fuel for locomotives on the Imperial and Royal State Railways cost, before the war, 55,000,000 crowns, the acquisition of this material for the railways of the Republic—although these lines are reduced by three quarters, and in spite of the considerable restrictions in the traffic necessitated by the lack of coal—costs 2,000,000,000, of which 1,850,000,000 are due solely to the loss on exchange caused by the depreciation of Austrian money.

The following examples will show the movements in the price of working materials :

Price for	Aug. 1914	Dec. 1920
	Crowns.	
100 kg. of petrol	25	3,200
100 kg. of benzine	37	6,000
100 kg. of sheet-iron for boilers	29	2,400
1 pr. of wheels	450	36,000
100 kg. of copper	180	20,000
100 kg. of tin	385	62,000
one sleeper	4	165

The administration of the State Railways is making every effort to cover increased expenditure by a corresponding increase in rates (which have been considered in detail elsewhere), but the travelling public and those who despatch goods by rail have, after all, only a certain paying capacity, and the limits of this capacity have very nearly been reached.

It might, nevertheless, have been hoped that the financial situation of the railways would improve slightly, if traffic increased somewhat.

The indispensable condition of such improvements, however (apart from the drawbacks attendant on the necessity of depending upon foreign countries for coal supplies), is the restoration of Austria's economic situation, which will continue to be more than precarious as long as the burdensome provisions of the Treaty of St. Germain are strictly observed.

II

NAVIGATION

A. Material

1. *Condition of the Ports.*

Danube.—If we include in the term "ports" all closed harbour basins, the Austrian section of the Danube possesses the following ports:

(a) Vienna-Freudenau;
(b) Vienna-Kuchelau;
(c) Linz.

As regards *(a)*, the port of Vienna-Freudenau is used in the first place as a harbour of refuge and a wintering port. It has an area of 43.5 hectares, a total length of bank of 6,200 metres, and it is dredged out to a depth of 5 metres below the mean water level. The port, which was open to traffic in 1903, can take 400 boats.

It is provided with a system of roads, power-stations and electric-light installations; it has a water-main bringing water from the Alps, and it is connected directly by lines of railway to the Danube river-side railway ("Donau-Uferbahn"). Since 1915 the port has been equipped with four yards, with a total capacity of 960 trucks, for direct transhipment.

As regards *(b)* the port of Vienna-Kuchelau has an area of 13.3 hectares, a total length of bank of 3,400 metres, and it is dredged out to a depth of 4.5 metres below the mean water level. In this port, which is not being used at present, 100 boats could be accommodated, if required.

With regard to *(c)*, the port of Linz, a harbour of refuge and wintering port, has an area of 6.5 hectares, a depth of 4 metres below the normal level of the water at Linz; it could accommodate about 100 boats. It is connected by direct lines of railway with the State railways.

Lake Constance.— On Lake Constance there are situated :

(a) The port of Bregenz, besides public berthing places for vessels at :
(b) Hard ;
(c) Lochau, and
(d) Fussach.

As regards *(a)*, the port of Bregenz is used for both passenger and goods traffic.

The establishments of this port are duly equipped with the installations necessary for goods traffic (cranes, sheds, goods yards etc.).

With regard to *(b)*, *(c)* and *(d)*, the berthing stations for vessels at Hard, Lochau and Fussach are primarily used for passenger traffic. Goods are only handled to a very limited extent at these places (the despatch of luggage, loading and unloading of goods exempted from all customs duties).

2. *Congestion.*

The sheds of the Danube ports and the other working installations are, generally speaking, sufficient for the requirements of the traffic, so that both before and after the war, as also at the present time, congestion has only arisen as a result of abnormal conditions (strikes, ca'-canny, periods of unusually high or low water, boycotts), and has only been temporary ; it has always been completely coped with in a very short time.

3. *Condition of the Waterways.*

In Austria the Danube is the only waterway of importance for traffic. Its Austrian section (from Passau to Thebes) has a length of about 343 kms., of which 146 kms. has a rocky bed, as the river flows through mountainous country. The remaining 197 kms. traverse river valleys, where the river has dug its bed in soft soil. The Danube, in its Austrian section, has the character of a mountain river with a steep fall of water and great differences of level in times of flood and low water. Only a few hard rocks have been able to withstand the force of the current, and these still form an obstacle to the improvement of the navigable channel.

Works for the improvement of navigation on the Danube were begun early in the Middle Ages; the first systematic works for controlling the flow of water were undertaken from 1850 onwards. In the second half of the 19th century steps were taken to form a navigable channel, controlled on the basis of a mean water level ; and towards the end of the century control was undertaken on the basis of the level in times of low water.

The object of this system of control is to provide a navigable channel which, even when the water is lowest, will have sufficient depth and width ; these works must assure an effective depth of 2 metres (in sandy sections) and of 2.1 metres (in rocky sections) when the level of the water is lowest.

The works which have hitherto been executed—the works intended to ensure navigability when the waters are low have only been partly carried out—had already so far succeeded that, (over the shallows in sandy sections of the river), a minimum depth of 2 metres, reckoned below the low-water level, had been obtained throughout. Only a few sections are still in process of construction and development ; even these, however, do not all present difficulties at periods of low water, because experience has shown that, when the water falls, a certain scouring takes place in the shallows.

So far as circumstances will allow, it is proposed to extend this control to sections of the river in which works have not yet been undertaken, in order to provide a channel, at low water, throughout the whole course of the river.

As regards the rocky portions of the river situated in the "Kachlets" of Aschach and of Brandstatt, and also in the rapids of Grein, where the required results have not been attained, it will be necessary to take special measures to deepen the channel to the required extent.

4. *Upkeep (Normal and Exceptional).*

In the Austrian section of the Danube, upkeep work of an urgent nature has always been, and, so far as possible, continues to be, carried out without any delay.

In view of the generally satisfactory condition of the navigable waterway there is no urgent construction work of importance apart from small repairs and local dredging.

The principal task for the near future in connection with stabilising the channel (a task that is more important than ordinary upkeep work) is the continuation and completion of this work of stabilisation near Schildorf, Ashach, Goldworth, Steining-Abwinden, Ruprechtshofen, Wallsee, Ebersdorf, Tulln and Orth.

The purpose of this work is to ensure, at these points, a practicable depth of 2 or 2.1 metres below the level of the lowest watermark, a level which has not yet been finally determined.

5. *Improvement of Existing Ports and Works on Proposed New Ports or New Waterways.*

In considering the works intended to improve the course of the Danube in Austria, it should be noted that the deepening of the navigable part of the Danube throughout its extent to a minimum depth of 2 or 2.1 metres—as Austria had proposed—will necessitate similar work on all parts of the river which do not yet conform to these requirements. The necessary work in connection with this scheme will be carried out, as we have already stated, as soon as credits are available.

The importance of Vienna as a transhipment centre and as a port, and the consequent necessity for improving the traffic installations already in existence on the right bank of the Danube at Vienna, have given rise to a scheme for the development on a considerable scale of the installations for large vessels at Vienna. This scheme is to serve at the same time as a protection against floods, as an improvement of the waterway for large vessels as well as for the development of the port; essential parts of the scheme are the prevention of floods in the area on the left bank of the Danube at Vienna, the construction on this territory of a channel adapted for large boats and for unloading purposes, as well as the raising of the level of the ground on both sides of this channel to the height of the right bank of the principal waterway. The river-side sites obtained by this work of construction along the channel, which would have an area of about four million square metres, could be transformed intotranshipment stations. In connection with the establishment of this channel, which is to serve as a navigable waterway, it is proposed to convert the old bed of the Danube into a spacious port. The capacity of these new establishments as regards transhipment services, which would be about 12 million tons per year, would probably be quite sufficient for the future. The realisation of this scheme, the total cost of which would be 282 million crowns (calculated according to the normal prices of the pre-war period), can hardly be regarded as a matter for serious consideration, in view of the terrible state of Austrian finances.

As regards the construction of new artificial waterways, as Austria has no sea-coast, it is not possible for her to establish upon her territory any communication between her principal waterway, the Danube, and the sea, although to-day this would be of greater value than ever to her economic and commercial interests. This is especially true as regards the construction of a canal running directly from the Danube to the Oder, which would guarantee to Austria a natural outlet to the North Sea and the Baltic. Before the war Austria had prepared a scheme for the construction of this waterway with an extension to Vienna; the territorial changes which are the consequence of the war have completely removed the possibility of Austria having any influence on the construction or course of such a canal. It appears that Czecho-Slovakia, which still favours the idea of this canal, intended to select a course which, avoiding Austrian territory, would run into the Danube near Thebes, 50 kilometres beyond Vienna. Compared with the line formerly proposed by Austria, which would have entered the river near Vienna, the sole advantage of this new line would be slightly to shorten the waterway (Vienna-Thebes). This might facilitate transport between the north and south-east of Europe. But this advantage is of slight importance, and its economic effect is problematic; for the great disadvantage of this route would be that all transport intended for Vienna and places situated above Vienna would have to pay extra freightage to return upstream from Thebes to Vienna.

It is thus, for economic reasons, greatly to Austria's interest that the future canal from the Danube to the Oder should enter the Danube at a point near Vienna, or that at least the city should be connected by a branch canal to the new line, in order to avoid the above-mentioned detour (upstream from Thebes to Vienna). This object could be easily attained by the construction of a canal about 40 kilometres long, which would join the proposed waterway near Ungeraiden and would connect with Vienna.

6. *Condition of the Fleet.*

Danube.—First Danube Steamship Company (Erste Donau Dampfschiffahrts-Gesellschaft).

The company's fleet before the war consisted of 142 steamships of 63,400 registered horse-power and of 868 steam tug barges for goods with a total tonnage of 472, 768 tons. The fleet included, in addition, 215 pontoons, 1 floating dock, 1 floating dredger, 2 grain elevators, 5 floating steam cranes and 1 floating steam pump.

During and after the war this material was considerably reduced, on the one hand owing to the loss of boats which were sunk (only a few of which could be refloated), and on the other hand by the seizure and requisitioning of material by the Governments of Roumania and the Serb-Croat-Slovene State when the old Austro-Hungarian Monarchy was broken up.

In addition, the company lost some of its vessels, which it was forced to give up to the Danube Command at Belgrade when the Armistice was concluded between Hungary and General Franchet d'Esperay.

On the other hand, the company's shipping has been increased since 1914 by sixteen steamboats, 68 steam tug barges and 10 tanks. Reliable figures as to the present strength of the Danube fleet are not at present obtainable.

The South German Danube Steamship Company (Süd-deutsche Donau-Dampfschiffahrts Gesellschaft).

This limited liability company was constituted in accordance with German law; all its shares were acquired by the Austrian Government in 1910. At the beginning of 1914 its fleet comprised 12 steamships of 6800 registered horse power, 3 motor-boats of 720 effective horse power and with a tonnage of 1950 tons, 115 for towing, with a tonnage of 76,751 tons, and also a floating crane.

This company, like the Austrian company, suffered the loss of a considerable amount of material in the period immediately following the war.

Lake Constance.—The Austrian fleet on Lake Constance comprised, before the war, 5 paddle steamers with a total registered horse-power of 2,898, 1 screw steamship of 250 registered howe-power, 1 coal barge and 4 transhipment ferry-boats.

No change has occurred except the sale of two of the transhipment ferry-boats.

B. TRAFFIC.

1. *Navigation.*

Danube.—1. Passenger Service. The passenger service on the Austrian section of the Danube was carried on before the war exclusively by the First Danube Steamship Company (Erste Donau Dampfschiffahrts-

Gesellschaft). This Company maintained a postal service on the line Linz-Vienna, an express service on the line Linz-Vienna, and a local service on the line Passau-Linz, and on the line Grein-Melk-Krems-Hollenburg.

On the Austrian Line the company had also, as a first step, instituted postal services between Vienna-Budapest and local services between Vienna-Bratislava.

On these parts of the Danube outside the limits of Austria, the company also maintained postal services between Budapest and Sulina, as well as local services on certain parts of the Danube in Hungary, the Drave, the Save and the Theiss.

Shortly after the war, serious difficulties arose as regards the transport of passengers on the Austrian part of the Danube, due to the holding up by Hungary, Roumania and the Serb-Croat-Slovene State of a considerable number of floating craft, and also to the scarcity of coal in Austria. The passenger service in Austria could thus only inadequately be maintained, being very restricted and at times even entirely interrupted. A passenger service beyond the Austrian frontier was at first not possible.

Latterly, however, the situation as regards fuel has improved, so that it is now possible slightly to increase the passenger service on the Austrian section of the Danube ; at the same time, owing to the influence of the Inter-Allied Danube Commission, services beyond the Austrian frontier (postal line to Budapest and local line to Bratislava) have been resumed. It has also been possible to organise several local services in the interior of Hungary ; vessels are still, however, unable to proceed beyond the station of Baja (frontier between Hungary and the Serb-Croat-Slovene State).

The South German Danube Steamship Company (Süd-deutsche Donau Dampfschiffahrts-Gesellschaft) has never undertaken a passenger service. The Royal Hungarian Sea and River Navigation Co., Ltd., on the other hand, which formerly had no passenger service on the Austrian part of the Danube, established last year for the first time, a passenger service between Vienna and Budapest.

2. Goods Traffic.—Before the war the Austrian company maintained regular express services for goods traffic on the whole of the Danube as far as Sulina. Immediately after the war, the goods traffic, together with the passenger service, was almost entirely interrupted. Outside Austria, sailings only took place in exceptional cases, and then only when a safe conduct had been granted in each case by the Inter-Allied Danube Commission.

The regular goods traffic has now been resumed as far as Baja ; in co-operation with the Serb-Croat-Slovene Kingdom, Bulgaria and Roumania, certain services have also been established for the transport, in large quantities, of important supplies intended for Austria (especially wheat, petrol, etc.). The resumption of regular services beyond Baja had till then not been found possible.

Before the war, the German company carried on, with its own craft, the regular goods traffic on the Danube and its tributaries in the section between Vienna and Belgrade ; on the part of the Danube below Belgrade, transport of goods was carried out jointly with the "Navigazione fluviale Romana".

After the war the service of the German company was affected by the same circumstances and conditions as the Austrian company.

Lake Constance.—1. Passenger-Service. The Austrian passenger-service on Lake Constance has been carried on by the "Austrian Lake Constance Steamship Company", which is operated by the Directorate of the State Railways at Innsbrück. Before the war there were, apart from certain local services, four winter and nine summer services on the main line from Bregenz to Constance. During and after the war it was necessary considerably to restrict this traffic, and only during last yearh as it been found possible to restore it even to a moderate extent (3 services daily).

2. Goods-Services.—Up to the present the navigation companies have carried on goods traffic mainly by means of transhipment ferry-boats (Bregenz-Constance, Bregenz-Friedrichshafen, Bregenz-Romanshorn). After the completion of the circular railway line around the lake the transhipment ferry-boat service gradually lost all importance and has, in fact, now been completely suspended. There are no Austrian barges on the lake.

2. *Passenger Traffic.*

Danube.—In 1913, the last year before the war, the Austrian Danube Company carried, on all the lines used for the transport of passengers, a total of 2,206,460 passengers.

In 1918 the number of passengers carried exceeded that of 1913, and in spite of considerable restrictions in force on the system, a total of 2,477,212 was reached. This surprising circumstance is largely due to the fact that traffic on the Austrian railways was almost entirely suspended at this period.

In 1919 the traffic on the railways being no longer so restricted, the total number of passengers carried fell considerably in a proportion corresponding with the reduced length of the lines in working, and did not exceed 990,457.

Lake Constance.—In 1913, 282,502 passengers were carried in Austrian steamships on Lake Constance. As a result of the restrictions put in force during the war, and also on account of other traffic difficulties, the number of passengers using the line fell considerably, and during the year 1918-1919 did not exceed 101,359 passengers. Quite latterly the number of passengers has shown a tendency to increase.

3. *Tonnage of Goods Carried.*

Danube.—The total figures for goods arriving at, and despatched from, forwarding offices on the Austrian Danube (ports, stations, agencies, landing quays) was 1,587,794 tons, (exclusive of the goods service in the winter ports). In the period immediately following the war, goods traffic decreased considerably; this was due to economic and political circumstances in general and also to the complete interruption of the direct services on the Danube; compared with pre-war figures the difference is enormous.

It is only latterly that the traffic on the Austrian part of the Danube has been resumed.

Exact statistical data are not yet available.

Lake Constance.—In 1913 Austrian boats on Lake Constance carried a total of 160,481 tons of goods in all (principally coal, timber, corn and chemical products). This was largely carried out by means of transport ferries. On account of the restriction, and later of the complete suppression of this ferry-service, the amount of goods carried to-day by this service has necessarily fallen to an insignificant figure. In 1919-1920 about 140 tons of goods were transported.

C. Freights.

Before the war passenger fares on the boats (higher for upstream than for dowstream traffic) were much below railway fares. They have been increased several times during and since the war. Comparing the pre-war and post-war fares, it appears that in the autumn of 1918 they were increased by about 70-150 %, whilst to-day they are 14 to 26 times higher.

Before the war the rates for goods traffic (single parcels) were low. During and after the war they were considerably increased; in the autumn of 1918 the rates for the most important services were raised from 30 to 240 %; at present they are from 30 to 80 times higher than before the war. It is very difficult to compare the pre-war and post-war situation for the rates for the transport of goods in large quantities to and from foreign countries, not only because, since the beginning of the war, navigation on the Central Danube has often been interrupted, sometimes for long periods, but also because the exchange rates of the various countries differ so greatly.

D. Fuel.

Total Consumption for each type of Fuel; Source of Fuel; Cost Price per Ton.

The conditions for navigation on the Danube require in general the employment of coal. Authentic figures for the total consumption of coal on the Austrian part of the Danube do not exist. In normal times the boats often coaled outside Austrian territory. Statistics concerning the consumption in the different territorial sections have never been drawn up by the States through which the river flows.

The following figures are intended to give only a general idea. The largest undertaking, the First Danube Company, consumed, in 1913, 209,242 tons in all (total consumption by steam-ships, docks, stations, etc., on the whole of the Danube). The source of supply of this coal was from:

Pecs	153,741	tons
Upper Silesia	33,592	»
Ostrau	21,809	»
England	100	»

In 1919 the total consumption was 30,370 tons, coming from :

Pecs	2,955	tons
Upper Silesia	20,890	»
Ostrau	2,320	»
Tatar and Dorogi	4,205	»

The price per ton in 1913 was :

15 crowns for coal from the mine of Pecs belonging to the company; 23 crowns for foreign coal.

In 1919 these prices rose to :

243 crowns for coal from Pecs; 434 crowns for foreign coal.

The Austrian boats on Lake Constance use coal (especially coal from the Saar Basin). The total amount of coal consumed by these boats was 4,371 tons in 1913 ; this figure fell considerably in consequence of traffic-restrictions after the war, and did not exceed 850 tons during the period 1918-1919.

E. General Financial Situation of Internal Navigation.

Navigation on the Danube is by far the most important factor in internal navigation in Austria. Even before the war it was threatened with serious obstacles. Traffic during the year 1913 was particularly affected by the serious crises arising from the consequences of the Balkan wars ; these consequences were particularly felt on the territory of the Lower Danube and also had a detrimental effect on Austrian navigation.

Austria was obliged to make great efforts to develop the goods service, especially on the Upper Danube, in order to as far as possible consolidate the general situation and her future economic opportunities. Later on, when the Danube formed part of the territory invaded during the war, Austrian navigation closed throughout the entire extent of the river. The consequences of the war and of the Treaty of Peace have also — this is self-evident — had an extremely detrimental effect upon the situation of Austrian navigation on the Danube. Apart from the precarious situation of transit on the Danube, Austrian shipping is also menaced by special dangers arising not only from the still-unsolved problems of the confiscation of a considerable part of its fleet and of the sequestration of the depôts, etc., situated in the States of the Lower Danube, but also from the handing-over of material under the clauses of the Treaty of Peace. Under present conditions, Austrian navigation on the Danube cannot attain a second economic development and an assured existence until the above-mentioned problems have been solved in a manner responding to the vital and fundamental interests of the country.

III

MOTOR TRANSPORT.

The number of motors employed in Government service was :

(1) beforė the war, 1914, about 100 motor buses used for transport of passengers between different towns ;

(2) to-day this figure is about 30 motor buses serving for transport of passengers between different towns, and about 130 motor lorries used for the transport of mails, food supply and raw materials.

These services continue to be very restricted on account of the great cost of working them. The difficulty in obtaining fuel also considerably hinders the development of motor transport.

IV

AIR TRANSPORT.

Before the war, Austria had no aerial traffic. During the war efforts were made to establish aerial lines for the postal service by means of military aeroplanes between Vienna and Budapest, and from Vienna, *via* Cracow and Lemberg, to Kieff ; these attempts were, however, suspended after a few flights.

Like other countries, Austria would be very glad to adapt the aeroplane to pacific purposes and to create a national air service which could be adapted to the lines of international traffic and would connect Austria with the air traffic of the world.

For the moment, the realisation of these plans is unfortunately hardly possible. On the one hand, the Treaty of Peace of St. Germain obliges Austria to deliver to the Principal Allied and Associated Powers all the old military' planes, and deprives her of all the means of starting an aerial traffic, of however modest a character. On the other hand, the prohibition imposed upon us, for an indefinite period, of obtaining, importing or exporting air-craft prevents us from obtaining the necessary material for the establishment of an air service.

Moreover, the Conference of Ambassadors in Paris has — by virtue of the above-mentioned Treaty of Peace — decreed the destruction, demolition or transformation of all installations on the sites which have been used so far for air services ; the retention of only a very small number of these buildings is permitted, so that even the essential preliminary conditions and installations for an air service are still lacking.

BELGIUM.

I.

RAILWAYS.

Material.

Condition of the Lines and Constructions.—Before the war the railway system operated by the Belgian Government had a total length of 4,373 km., of which 2,207 km. were double-track lines; that is to say, there were 6,508 km. of main lines.

During the war, 1,100 km. of railway lines were totally destroyed and 400 km. partially destroyed. The total reconstruction necessary amounted to 2,000 km. of main lines.

At the time of the Armistice 1,400 structures, of varying sizes, had been completely destroyed. At the present moment there are only three points at which the lines remain interrupted, namely:

1. The bridge at Selzaete on the Ghent-Torneuzen Canal;
2. The bridge at Huy-sur-la-Meuse;
3. The Louise-Marie Tunnel, between Audenarde and Renaix.

The structures which carry the line have all been restored, and, in the majority of cases, in a permanent form.

Good progress has also been made with the restoration of structures carrying crossings above the line.

All the lines were again in operation as early as July 1st, 1920. However, there are still 260 km. which require to be relaid to complete the double-track in all the sections which were double before the war.

During the war, various new lines were laid, and others were converted to double-track. The total length of lines on the Belgian Government system is, at present, 4,513 km. 675, of which 2,252 km. 395 are double-track, *i.e.*, some 6,766 km. of main lines. These figures do not include the lines in the districts of Eupen and Malmédy, which have a total length of 152 km. 580.

With regard to new lines in contemplation or under construction, the programme decided on includes:

1) The construction of 160 km. of double-track lines. The scheme provides for a quadruple track over 35 km. of the above as soon as the exigences of the service require it.
2) The conversion to quadruple track of 37 km. of the existing double-track.
3) The conversion to double-track of 360 km. of single-track.

Condition of Rolling-stock.—During the war rolling-stock was subjected to intensive use, and repairs were reduced to a minimum. A great part of the stock is therefore almost worn out, and it has been found necessary to scrap many of the wagons.

Not until all our rolling-stock has passed through the workshops for repairs or overhauling will our railway administration have a supply of rolling-stock in a more or less serviceable condition at its disposal.

Traffic.

(*a*) *Passenger Traffic.*

The rates of the average daily number of locomotive-kilometres to passenger trains is as follows:—

In 1913: 137,383 locomotive-kilometres.
At the time of the Armistice: 0 » »
At the end of January 1921: 80,476 locomotive-kilometres, represents 58.6 % of the pre-war traffic.

Therefore, the average frequency of passenger trains, *i.e.*, the average number of passenger trains circulating on the Belgian Government's lines (length 4,373 km. in 1913, 4,513 km. in 1921), was:

In 1913 . . . . 137,383 : 4,373 = 31 trains
In January 1921 . . . . 80,476 : 4,513 = 18 trains

The resumption of the passenger train service was especially difficult in Belgium, owing to the fact that it was necessary to utilise Belgian and ceded German rolling-stock, which was, as a rule, in a bad state of repair.

Further, the shortage of fuel necessitated the restriction of traffic to a lesser number of trains than before the war. Endeavours were therefore made to provide a service limited to actual requirements; the best possible connections were arranged at all junctions.

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As regards the number of international trains in 1914 and 1921 a comparison gives the following results:

	July 1914.	Armistice.	March 1921.
Ostend-Dover (Boat Service)	3	0	2
London-Ostend-Brussels-Cologne	3	0	2
London-Calais-Brussels-Cologne	3	0	1
London-Ostend-Bâle-Milan	3	0	2
Brussels-Cologne	8	0	5
Brussels-Bâle	5	0	4
Brussels-Berlin	2	0	2
Paris-Cologne	7	0	2
Paris-Cologne-Berlin	2	0	2
London-Ostend-Berlin-Petrograd	1	0	1 (1)
Paris-Cologne-Berlin-Petrograd	1	0	1 (1)
London-Ostend-Cologne-Vienna-Balkans	1	0	1 (2)
Antwerp-Gladbach-Dortmund	3	0	1
Amsterdam-Brussels-Paris	3	0	2
Brussels-Amsterdam	7	0	2
Brussels-Paris	6	0	5
Brussels-Antwerp-Harwich-London	1	0	
Brussels-Zeebrugge-Hull	1	0	

(1) Resumed to Warsaw only.
(2) Resumed to Bucarest only; but thrice weekly from Nuremberg to Bucarest, changing at Vienna.

Belgium plays a part in the connection, established between Western Europe and the Balkans since the Armistice, by means of the Simplon-Orient Express, along the 45th parallel of latitude, but the Dover-Ostend route is at a disadvantage for this journey in comparison with the Dover-Calais route, as passengers travelling by the latter from London to the Balkans have a direct connection, whereas, by the Belgian route, they must leave London the previous day and spend a night either at Ostend or at Brussels.

For passengers going in the opposite direction there is, at present, sea connection for London by both routes; however, from June 1st, 1921, onwards, the train arriving from the Balkans will reach Milan too late to enable connection to be made with the London-*via*-Ostend train, thoug the Calais connection will not be affected. Only one connection will remain, having Brussels as its terminus.

Holland also plays a part in the connection with the Simplon-Orient Express by means of a through-carriage, Amsterdam-Brussels-Milan. An attempt had also been made to establish a route by the Amsterdam-

Maestricht-Liège-Jemelle line ; it was found necessary, however, to abandon this project, as the number of passengers was negligible.

The change in the time-table of the Simplon-Orient Express on its way back from the Balkans will, from the point of view of Holland, have the serious drawback of causing travellers to miss the connection for Rotterdam, The Hague and Amsterdam. The only course open to these travellers will be to stay in Brussels or select a different route.

Belgium also takes a part in the communication established along the 50th parallel of latitude, known as the Paris-Warsaw-Vienna Express route. Connection with this train was made at Strasburg by sleeping-cars from Ostend *via* Brussels. These sleeping-cars are now running to Vienna and Berlin *via* Cologne. Belgium, however, thus loses her former direct communication with Munich and Prague, though she hopes that it will be restored *via* Cologne and Nuremburg, as well as her pre-war connections with Marienbad and Franzensbad.

On the Belgian-Alsatian line (London-Dover-Ostend-Brussels-Strasburg Bâle) the best and most important train is threatened with the loss of its Milan connection after June 1st, 1921 ; this is the service which leaves London at 8.30, Ostend at 16.25, Brussels at 19.30, arriving at Bâle at 9 on the following morning and at Milan at 20.35. The Belgian Railway Department has made strong protests against the carrying out of this decision and continues to protest. Although, in the present state of negotiations, there appears to be little ground for hope, it will continue to make representations to the various administrative bodies concerned until a measure so prejudicial to the interests of the Ostend-Dover line has been revoked.

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Belgium, which, because of its geographical situation, has been named the cross-roads of the nations, has a vital interest in the restoration of the various international railway communications which existed before the war.

Since the Armistice, she has already made considerable efforts with this object : train services now radiate from Brussels to London, Paris, Bâle and Milan, Cologne and Vienna, Cologne and Berlin and Amsterdam.

Belgium is making every effort to promote the restoration of the excellent international services which she enjoyed before the war, and for this she relies on the support of all the nations concerned.

Passenger returns.

Number of passengers carried in 1913 : 204,541,098
» » » 1919 : 102,396,936
» » » during the first five weeks of 1920 : 80,257,852

(We are unable to furnish information for the period from June 1st, 1921, to the present date.)

(*b*) *Goods Traffic.*

The ratio of the average daily numbers of locomotive-kilometres to goods-trains is as follows:

In 1913: 130,340 locomotive-kilometres;
At the Armistice: 0 » »
At the end of January 1921: 92,022 locomotive-kilometres, representing 76.6 % of the pre-war traffic.

Therefore the average frequency of goods locomotives, with trains, operating on the Belgian Government lines was:

In 1913: 130,340 : 4,373 = 30 trains;
In January 1921: 92,022 : 4,513 = 20 trains.

The number of trucks supplied for transport for journeys commencing on the Belgian Government system was:

	In	1914	20,200
End of	December	1918	1,410
»	June	1919	10,741
»	December	1919	13,082
»	June	1920	15,904
»	October	1920	18,361
»	January	1921	15,179 (crisis)

To obtain the above results it was necessary:

1. To re-lay 2,200 kilometres of main-lines, as stated above.

2. To effect the re-opening of 593 stations and halting places, which it was impossible to use for goods traffic at the time of the Armistice (out of 1,450 existing before the war).

3. To repair the chief marshalling stations which had been destroyed by explosions, and thereby rendered unserviceable for the marshalling of trains.

4. To free the lines of some 30,000 trucks loaded with munitions, material and captured stores, which were distributed in such a way as seriously to impede the reorganisation of traffic.

5. To organise a temporary signal system and re-equip the workshops.

Tonnage of Goods.—Monthly average in 1914 (heavy goods) 5,121,415 tons; immediately after the Armistice: 692,349 tons; in 1920: 4,256,573 tons.

Tariffs.

Increase in passenger rates	Immediately after the Armistice	40 %
	At present	120 %
Increase in freight rates	Immediately after the Armistice.	40 %
	At present : tariffs 1 & 2.	200 %
	Tariff 3-3 first classes. For consignments charged according to minimum weight of 100,000 kg. and per truck	200 %
	For consignments charged according to minimum weight of 5,000 kg. and per truck	260 %
	Tariff 3 - 4th class	150 %

Fuel.—Before the war the railway authorities purchased a certain amount of bituminous coal, rubbly-coal and briquettes for locomotives in England and Germany.

From the Armistice to June 1920, all orders for railway-fuel were given to Belgian mines. In June 1920 the authorities received 4,870 tons of German coal, but in view of the higher cost of this fuel as compared with that of our own coal, we have ceased to use it.

General Financial Situation of the Railway Systems.

The following table shows the result of the working of the Belgian Government railways for the financial years 1913, 1919 and 1920.

The figures referring to the fiscal year 1919 are only approximate, and those for 1920 are only an estimate.

Financial Situation of the Belgian Government Railways.

	1913	1919 (1)	1920 (2)
Average length of line in operation.	4,368.5	3,776.00	4,413.8
Original capital..................	2,932,822,456.20	3,056,777,605.00	3,152,312,788.00
Total receipts	341,866,421.89	346,554,209.22 (3)	865,200,000.00 (4)
Cost of operation	248,870,835.00	516,807,358.00	1,028,517,975.00
Net receipts	92,995,586.89		
Debit balance		170,253,148.78	163,317,975.00
Financial expenses.			
a) Normal expenditure:			
Interest.........................	79,510,055.58	83,090,868.75	86,202,751.00
Depreciation fund	21,737,930.24	23,576,015.88	24,401,138,00
Total..........	101,247,985.82	106,666,884.63	110,603,889.00

Financial Situation of the Belgian Government Railways. (Continued.)

	1913	1919 (1)	1920 (2)
Brought forward	101,247,985.82	106,666,884.63	110,603,889.00
b) Expenditure incurred through the War :			
Interest		7,696,757.58	25,556,907.00
Total of financial expenses	101,247,985.82	114,363,642.21	136,160,796.00
c) Part of the receipts to be allocated to companies holding concessions..	7,152,504.63	7,821,709.01	17,000,000.00
Total of general expenses	108,400,490.45	121,685,351.22	153,160,796.00
Debit balance	15,404,903.56	291,938,500.00	316,478,771.00
Co-efficient of exploitation	72.80 %	149·13 %	118.88 %

(1) Approximate situation.

(2) Estimate.

(3) Not including the receipts from military transport in **1919**, the balance for which is still due.

(4) Not including the receipts for military transport during the first five months of **1920**, the balance for which is still due.

II.

INLAND WATER TRANSPORT.

The present situation in regard to inland navigation is marked by the considerable increase in the cost of transport by water, as compared with pre-war charges.

This increase is so marked that a result, which appears to be economically paradoxical, has been produced, *viz.* : the cost of inland motor-transport is now normally greater than that of railway-transport, and the former has thus lost the only serious advantage which it possessed over the latter, that of cheapness. This clearly constitutes a grave menace to inland navigation ; it is true that certain goods are still being transported by water, but this is only because the railways are not always able to cope with the demands made on them, and because the exorbitant cost of rolling-stock seriously impedes the purchase of new trucks.

The situation, in this respect, will be very different when the price of rolling-stock begins to fall ; unless some means is found of lowering the present freight rates for inland water transportation, it is to be feared that the partial stagnation to which this industry has already been reduced will develop into complete paralysis, and that the rôle of inland vessels will be limited to that of a floating store, or a means for the transhipment in bulk of certain cargoes brought by sea-going ships.

The various reasons which have caused this large increase in river and canal freights are set forth below.

In 1914 the average charge for the hire of a light barge of 38 m. 50 was 0.05 c. per m. ton per day. Throughout 1920 this rate fluctuated in the neighbourhood of 0.25 c., *i.e.*, five times the pre-war tariff. The situation has been even more unfavourable in the case of navigation on the Rhine, where charter-parties have been concluded on a basis of 0.50 c. per ton per day.

There is clearly a large element of unjustifiable speculation in such fantastic prices ; this is proved by the fact that a few weeks later the same Rhine freights were quoted at 0.15 c. and 0.20 c., *i.e.*, at 15 % less, but there can be no doubt that, in view of the present situation of the raw material market, of labour and of fuel, etc., it will be difficult to maintain freight rates below 0.15 c. per metric ton per day.

The following table gives a comparison between water and rail freights for coal transported from Charleroi, Liége and the Ruhr to consumers in Brussels, Antwerp, Ghent and Paris for the years 1914 and 1920.

Port of Embarkation.	Port of Destination.	Freight by water in 1914 (Average for first six months.)	Freight by water in 1920. (Highest rates quoted.)	Railway freight in 1914.	Railway freight in 1920.
		Frs.	Frs.	Frs.	Frs.
Liége	Antwerp.	2.40	9-12	4.19 (2.58*)	13.50
	Brussels	3.10	13.50-15	4.03 (2.06*)	13.10
	Ghent.	3.60	13-16	4.51 (3.02*)	14.35
	Paris	7.85	50	—	—
Charleroi	Antwerp.	3.35	13-15	4.07 (2.14*)	13.18
	Brussels	2.50	12-13	3.02 (2.00*)	10.60
	Paris	7.10	30-40	—	—
Ruhr	Antwerp.	1.70	9-21	—	—
	Brussels	2.65	14.50-24	—	—
	Ghent.	1.65	10-23	—	—
	Liege	3.50	20-30	—	—

* The figures in brackets show the rates for goods in transit.

The present cost of towing on Belgian waterways is shown in the table below. The rates apply to light barges of 38.50 metres and a tonnage of 300 metric tons.

	In Canals.	Estuary of the Scheldt.	Sambre and Meuse.	
			Upstream.	Down-stream.
	Frs. per km.	Frs. per km.	Frs. per km.	Frs. per km.
Empty	1.95	2.65	2.65	1.55
Half-loaded..........	3.00	3.20	4.30	2.00
Loaded	3.60	3.80	5.70	2.50

On comparing the freight rates per kilometric ton in 1914 with the towage rates fixed in 1920 on the same basis (per kilometric ton) we arrive at the results shown below, which show that the present cost of towage alone is approximately equal to the total freight rates before the war.

Port of Embarkation.	Port of Destination.	Freight per kilometric ton in 1914.	Cost of towage per kilometric ton in 1920.
		Frs.	Frs.
Liége	Antwerp......	0.016	0.014
	Brussels......	0.015	0.013
	Ghent........	0.012	0.013
Charleroi	Antwerp......	0.026	0.036
	Brussels......	0.032	0.040

The chief causes for the increase of freight cannot be ascribed to the decrease in river and canal craft in Belgium.

The total losses suffered by the country under this heading during the war do not exceed 250,000 metric tons. Moreover, despite the fact that part of our stock found its way into France after the Armistice, it would be an exaggeration to state that this caused a shortage of lighters in Belgium. It was not even found necessary to put into force the measures originally contemplated for checking the exodus of these craft. At no period was the departure of Belgian lighters for destinations abroad prohibited, and the law of July 24th 1921 on the transfer of craft to foreign countries was applied in a very generous spirit ; in practice all applications for licences were granted.

Moreover, the number of tugs plying on the Belgian rivers has increased considerably since 1914. Amongst the booty abandoned by the enemy, Belgium recovered nearly 250 tugs. Half of these vessels are unserviceable for Belgian rivers ; having been built for towage on the Rhine, the Oder, the Elbe and the Weser, their draught is too great for our locks, etc. Further, the excessive demands made on them during the war have subjected them to such wear and tear that fully 100 had to be condemned as unfit for use as tugs.

The actual increase in horse-power, as compared with the pre-war figures, may be estimated at approximately 10,000 h.p. The increase in river and canal freights must therefore be attributed to causes other then the scarcity of transport material. These causes may be summarised as follows : increase in the cost of building, increase in working expenses and the decrease in working-hours.

1. *Increase in the Cost of Vessels and Tugs.*

The cost of the various classes of vessels has undergone a considerable increase in comparison with the increase in that of raw materials and labour.

A few facts relating to this increase are given below :

Class of ship	1914	1920
Tugs, per h.p.	180-225 fr.	1000-1500 fr.
Lighter, (spits) steel of 300 t. .	25,000 fr.	125,000-150,000 fr.
Lighter, wood of 300 t.	12,000 fr.	45,000 fr.
Rhine barge 1350 t.	100,600 fr.	400,000 fr.

The purchase price is therefore four or five times greater than before the war.

2. *Increase in Working-expenses.*

Crews.—Before the war the wages of a master or engineer of a tug rarely exceeded 175 francs per month ; that of a stoker or seamen varied from 90 to 125 francs. The latter rate was also paid to lightermen.

The present rates are as follows :

Master and Engineer	fr.	645	plus	60 fr.	if married
Stoker and Seamen	»	565	»	»	»
Lighterman	»	535	»	»	»
Deckhand	»	415	»	»	»

Fuel, Food, Supplies and Repairs.—The high price of coal is the main cause of the high cost of river transport. Indeed, fuel accounts for only half the running expenses of a firm engaged in steam-towing. The rates for towage are therefore in direct ratio to the price of coal. This also applies to the freight ratio, in which towage constitutes one of the chief elements.

In 1914 the price of a ton of high-grade briquettes varied from 20 to 25 francs. The present price of class 2 briquettes (containing a percentage of cinders three times greater than that allowed before the war) is 155 francs when loaded on trucks.

All other raw materials, such as oil, rope, sheet-iron, iron, wood hand-tools, have undergone a similar increase.

The French Sub-Committee on Transport, appointed by the Central Commission of Enquiry on the Cost of Living, has drawn up the following table, giving the variations of the principal articles employed in the repair of ships from 1913 to 1920.

Description	1914	1918	1919	1920
	Fr.	Fr.	Fr.	Fr.
Oak, 40 mm., per sq. m. . . .	11.00	18.00	25.00	27.00
Oak, 50 mm., per sq. m. . . .	8.00	13.00	20.00	25.00
Matchboarding, 15 mm., per sq. m.	3.00	7.00	9.00	10.00
Oak logs, per cub. m.	190.00	450.00	585.00	660.00
Single deck nails, per kg. . .	2.25	5.50	7.00	7.00
Tacks, per kg.	1.40	3.00	4.00	4.00
Bolts, per kg.	2.00	5.00	6.50	10.00
Tow, per kg.	1.50	2.50	7.50	8.00
Felt, per lineal metre	0.80	2.50	4.00	4.00
Sheet iron	25.00	96.00	100.00	142.00
Steel cable, per kg.	1.70	3.00	5.60	5.00
Ordinary cable	1.20			5.00

3. *Decrease in Working-hours.*

The working hours on vessels have been fixed till further orders as follows :

Month	Before 15.9.20.	After 15.9.20.
January	7 a.m. to 17	7 to 17
February	6.30 ,, ,, 18	6.30 ,, 18
March	6 ,, ,, 19	6 ,, 19
April	3 ,, ,, 19.30	6 ,, 19
May	4 ,, ,, 20.30	6 ,, 19
June	4 ,, ,, 21	6 ,, 19
July	4 ,, ,, 21	6 ,, 19
August	4 ,, ,, 20	6 ,, 19
September	5 ,, ,, 19.30	6 ,, 19
October	6 ,, ,, 18.30	6 ,, 18.30
November	6.30 ,, ,, 17.30	6.30 ,, 17.30
December	7 ,, ,, 17	7 ,, 17

The new regulations for the hours of navigation will result in a potential yield for the navigable waterways of 18 % during the summer months, and of 9 % for the whole year. The normal duration of journeys will undergo a proportionate increase.

It will be seen from the preceding statements that it would be difficult to reduce the freight rates sufficiently to restore the difference in cost, which existed before the war, between water and rail transport.

An essential condition for a fall in the freight rates is a reduction in the cost of towage. The latter itself bears a direct ratio to the price of fuel.

The prices at present paid for mechanical towage in Belgium correspond closely to the cost prices and leave a very scanty margin of profit for the tug-owners. Immediately after the Armistice, the Belgian Government established a government service, the I. W. T. (Inland Waterways Transport), to work the tugs which had been abandoned by the enemy. This service charges moderate and fixed rates, and exercises a stabilising influence over the cost of towage. It does not hold a monopoly for mechanical towage on Belgian waterways, and it is estimated that about 150 privately-owned tugs are competing with the Government service.

In practice, however, the scale of the I. W. T. regulates towage. The creation of this public service had the advantage of enabling towage to be organised in a rational manner at fixed rates, which are known beforehand, and which are independent of the violent fluctuations caused by the law of supply and demand. It has thus conferred on inland navigation an element of stability which is of the greatest importance in the present circumstances.

The above statement would be incomplete without a reference to a new measure, which has recently been decided on by the Minister of Railways at the suggestion of the Committee for the Exploitation of Navigable Waterways, which provides for an allocation of the transport of heavy goods between the railways and waterways.

Local sub-committees, comprising delegates of the railways, of the water transport services, and of users of the navigable waterways, will be formed in the principal industrial and commercial centres ; their business will be to ascertain the requirements of commerce and industry, and also the means of transport available, to fix a constant ratio between freights and the railway tariffs, and to make representations to manufacturers to induce them to use the means most suitable for the transport of their goods. In case of a shortage of rolling-stock, the railway may refuse to supply trucks to manufacturers or merchants who could send their goods by water but are unwilling to do so.

It is too early as yet to offer any opinion as to the results which may be obtained through the agency of these local committees ; but the innovation is worthy of note as it constitutes the first serious attempt to arrive at a practical understanding between the railways and waterways.

III.

MARITIME TRAFFIC.

A. Condition of the Ports.

The Belgian ports are at present adequately equipped for dealing with the maritime traffic which they are called upon to handle.

In few ports are the operations of loading and unloading carried out so rapidly ; vessels are rarely in demurrage ; the re-consignment of goods is effected promptly, and rarely gives rise to disappointment. Strikes are infrequent, and never of very long duration. As a general rule, it may be said that in no ports is the labour situation so good as in those of Belgium. The lighting of the structures of the ports, as also that of the rivers and canals, meets all reasonable requirements, while the police and fire arrangements, both on the river and in the docks and wharves, are well organised. There are few ports in which so few thefts are committed as in those of Belgium.

Special sheds, of recent construction, afford security and shelter for all descriptions of merchandise, and new buildings are being erected daily.

* * *

The wharfage dues are moderate, and may be advantageously compared with those of competing ports ; this applies also to the charges for the handling of goods. The river, docks, and canals are under the supervision and control of a competent staff. The best proof of this is the relatively small number of accidents and injuries to the shipping which uses our establishments.

In order to meet a possible expansion of maritime traffic, it has been decided to enlarge the installations mentioned above, especially at Antwerp. New wharves will shortly be built, new docks dredged, and the channel of the river will be improved. A large sea-lock, known as the Kruisschans, giving access to a new ship-canal, approximately 250 to 275 m. wide and 5 to 6 km. in length, will be constructed. A cutting which will make it possible to construct several kilometres of new wharves, will eliminate a bend existing at this point. New floating wet-docks and dry-docks will open out of this ship canal.

The building of new embankments on the left bank of the Scheldt has been approved, in principle, together with that of a three-way tunnel joining the two banks of the river.

The plant of the ports is constantly being improved ; *inter alia*, electric lighting will shortly be extended to all the wharves and docks, which will be connected with one another by electric tramways, while a service of swift launches will be established between them.

At Ghent the construction of a new wet floating dock, parallel to the two already existing, has been approved. Further, the city of Bruges intends to revive her former splendour by making Zeebrugge a terminal port for passenger steamers between the continent and the United Kingdom, America, etc., and at the same time a first-class mercantile and fishing port.

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The Belgian ports are seven in number : Antwerp, Ghent, Zeebrugge, Ostend, Nieuport, Brussels, and Louvain.

Antwerp.

The port of Antwerp is situated on the right bank of the Scheldt, at a distance of 35 km. from the sea. The river is wide and deep, and the tide runs far up it, so that ships of the largest tonnage can berth at its wharves without difficulty.

The port comprises two parts : the wharves along the river, and the docks which are accessible by locks. The wharves along the Scheldt, as explained in detail below, have an approximate length of 5,500 m., while that of the docks is approximately 18 km. ; the railway system of the whole port covers about 170 km.

There are fourteen docks : ten at the north end (provided with three locks), and three, for inland navigation, at the south (provided with one lock), together with another for inland vessels in the Canal de la Campine.

Antwerp also possesses a landing-stage above the town for unloading petroleum.

The port has no less than twelve dry docks (no floating docks).

The sheds cover a total area of more than 700,000 sq. m., and there are, in addition, many stores and warehouses belonging to the city or to private individuals.

The port possesses nearly 500 cranes, including one fixed crane (120 ton) two 40 ton, one 50 ton, one 30 ton, one 10 ton and one 5 ton cranes ; the remainder (electric and hydraulic) are 2 ton or 1.5 ton cranes (details given below). Mention should also be made of the " Kooltip " in the Campine dock, which lifts 15-ton trucks and unloads them automatically. (Not in working order at present.)

The plant for petroleum covers an area of over 30 km., the number of tanks reaching nearly eighty.

Information regarding Locks.—(*Note.* As all ship measurements are usually given in feet, this measure has been used here.)

Lock of the Bonaparte Dock.—(3 pairs of gates.) Width of entrance 54 ft. ; depth 18 ft. 7 inches (high-tide).

Kattendyck Lock.

Width of entrance 74 ft. 4 in.
Depth 31.7 inches.

Royers Lock.

Width of entrance 76 ft.
Length 594 ft.
Depth 33.6
Length between the piers of waterway 1,410 ft.

The dimensions of the largest vessel which can enter this lock may be as follows :—
Length 545 ft. ;
Beam 70 ft. ;
Draught, at high water, 28 ft.
Draught, at low water, 30 ft.

Dry Docks.--No floating docks.

Belonging to the City.	Length available for use.	Width of Entrance.	Height of blocks.	Depth not including blocks.
1	536.8	81.4	3–2 ½	20.5 ½
2	242.2	39.4	2.0	12.4
3	171.3	33.0	1.3	8.88
4	458.2	49.3	3.0	16.11
5	458.2	49.3	3.0	16.11
6	458.2	49.3	3.0	16.11
7	726.9	96.5	4.5	28.0
Hoboken (Cockerill)	400.0	41.0	2.8	17.6
Gruyebeke (Naval shipyards)	315	41.0	2.6	17.0
Antwerp Engineering	330.0	36.0	2.0	11.0
St-Anne (Left Bank)				
id. } 1. 2.	330	42.0	2.0	13.0

Docks and Wharves.—The docks and wharves and all the plant belonging to the port are the property of the authorities of the City of Antwerp and under their jurisdiction.

Wharves of the Scheldt.—On the south side only, covering a distance of 5,500 metres.

Rhine Wharf.	Length 2,152 ft. Depth at high tide 40 ft. » » low tide 26 ft. Plant : 4 movable cranes (2 tons & 1 ½ tons).
Van Meteran Wharf.	Length 443 ft. Depth at high tide 40 ft. » » low tide 26 ft. Plant : 5 cranes lifting from 1 ½ to 2 tons.

Ortelius Wharf.	Length 410 ft. Depth at low tide 40 ft. » low tide 26 ft. 5 cranes lifting 1 ½ to 2 tons.
Jordaens Wharf.	Length 787 ft. Depth at high tide 41.6 ft. » » low tide 27.6 ft. 5 cranes lifting from 1 ½ to 2 tons.
Van Dyck Wharf.	Length 902 ft. Depth at high tide 43 ft. » low tide 29.2 ft. 5 cranes lifting from 1 ½ to 2 tons.
Plantin Wharf.	Length 737 ft. Depth at high tide 34.7 ft. » » low tide 30.7 ft. 6 cranes lifting from 1 ½ to 2 tons.
St. Michel Wharf.	Length 902 ft. Depth at high tide 46 ft. » low tide 32 ft. 7 cranes of 1 ½ to 2 tons.
Cockerill Wharf.	Length 1,214 ft. Depth at high tide 48 ft. » low tide 34.2 ft. 15 2-ton cranes.
Station Wharf.	Length 1,479 ft. Depth at high tide 42.6 ft. » low tide 29 ft. 9 cranes: 6 3-ton, 3 1 ½-ton.
Herbouville Wharf.	Length 5,085 ft. Depth at high tide 40.6 ft. » low tide 27.6 ft. 54 2-ton cranes, 2 2 ½-ton cranes.
Ledeganck Wharf.	Length 1,640 ft. Depth at high tide 39 ft. » low tide 26 ft. 9 cranes: 6 3-ton, 3 1 ½-ton. 1 fixed 50-ton electric crane.

DOCKS.

Bonaparte Dock.	Length 493 ft. Width 558 ft. Length of wharves 2,133 ft. Width at entrance 46 ft. Average depth 21.6 ft. 15 movable cranes lifting 2 and 1 ½ tons.
William Dock.	Length 1,247 ft. Width 493 ft. Length of wharves 3,315 ft. Width at entrance 54.6 ft. Average depth 21.6 ft. 27 cranes lifting from 1 ½ to 2 tons.
Junction Dock (joining the William Dock to the Kattendyck Dock).	Length 1,247 ft. Width 164 ft. Length of wharves 557 ft. Width at entrance 57 ft. Average depth 24 ft. 4 cranes lifting from 1 ½ to 2 tons.
Kattendyck Dock.	Length 3,149. Width 460 ft. Length of wharves 6,496 ft. Width at entrance 81 ft. Length of dock 361 ft. Depth 22.4 ft. 3 fixed cranes lifting 20, 40 and 120 tons. 43 movable cranes lifting 1 ½ to 2 tons.
Mexico Dock. (Wood Dock).	Length 1,859 ft. Width 451 ft. Length of wharf 4,331 ft. Width at entrance 47.6 ft. Depth 23.6. 13 movable 2-ton cranes.
Campine Dock.	Length 1,127 ft. Width 527 ft. Length of wharf 2,822 ft. Width at entrance 47.6 ft. Depth 26 ft. 1 hydraulic coal-hoist of 45 tons. 17 movable 2-ton cranes.

Canal Dock (Asia Dock).	1 ore lighter with 2 movable cranes. Length 223 ft. Width 336 ft. Length of wharf 5,102. Width at entrance 47·75 ft. Depth 26.3 ft. 32 movable cranes (20 2-ton cranes and 12 1½-ton cranes).
Lefebre Dock (Amerika Dock).	5 movable hydraulic cranes lifting 1½ to 2 tons. 11 movable 2-ton electric cranes. Area 31 ½ acres. Length 1,003 ft. Average width 460 ft. Length of wharves 5,807 ft. Width at entrance 72.2 (Royers lock). Depth 30 ft.
Amerika Dock.	Area 18 acres. Length 1,314 ft. Width 601 ft. Length of wharves 5,009. Depth 30 ft. 34 movable cranes lifting from 1 ½ to 2 tons of grain. 12 floating cranes (grain elevators, capacity 150 tons per hour.)
Junction Dock (between Lethere Dock and Kattendyck Dock).	Length of dock 377 ft. Width 104 ft. Length of wharves 558 ft. Width at entrance 52.6 and 56.2. Depth 24.50 and 22.50 ft.

INTERMEDIATE DOCKS.

Canal Dock.	Length 2,149 ft. Width 820 ft. Length of wharves 5,807 ft. Width at entrance 72.2 ft (entrance by Royers lock).
Sea Canal.	Length 3,881 ft. Width 820 ft. Length of wharves 4,922 ft. Width at entrance 72 ft. Depth 30 ft.

First Wet Floating Dock.	Length 1,722 ft. Width 591 ft. Length of wharves 4,035 ft. Width at entrance 72 ft. Depth 30 ft. (entrance by Royers lock). 1 movable 30-ton electric crane and 7 movable 2-ton electric cranes.
Second Wet Floating Dock.	Length 2,428 ft. Width 656 ft. Length of wharves 5,512 ft. Width at entrance 72.2 ft. Depth 34 ft.
Third Wet Floating Dock.	Length 3,150 ft. Width 656 ft. Length of wharves 6,956 ft. Width at entrance 72.2 ft. Depth 37 ft.
Brick Dock.	Length 741 ft. Width 104 ft. Length of wharves 1,732 ft. Width of entrance 40.6 ft. Depth 17.6 ft. One movable crane lifting 1 ½ tons (entrance by old lock).
Coal Dock.	Length 807 ft. Width 164 ft. Length of wharves 1,854 ft. Width of entrance 36 ft. Depth 18 ft.
Boatmen's Dock.	Length 873 ft. Width 213 ft. Length of wharves 1.936 ft. Width of entrance 40.6 ft. Depth 17.6 ft.

Ghent.

This port is connected with the sea from Terneuzen by a canal of 19 miles.

The principal lock allows the passage of ships of 460 ft. in length, 56 ft. in breadth and 26.506 ft. in depth.

Outer Harbour.
Length 3,606 ft.
Width 295 ft.
Length of wharves 3,606 ft.
Depth 22 ft.
8 1½-ton electric cranes.

Commercial Dock.
Length of wharves 5,575 ft.
Depth 18 ft. 8 in.
Width at entrance 56 ft.
Width of entrance dock 330 ft.
4 2½-ton cranes.

	Length available for use.	Width available for use.	Depth with block.
Dry Docks (town).	1,446 ft.	42 ft. 8 in.	179 ft. + 2 ft. 9
	2,255 ft.	36 ft. 0 in.	149 ft. + 2 ft. 9
Wood Dock.	755 ft.	410 ft.	19 ft.
Tolhuis Dock.	1,310 ft.	305 ft.	21 ft.
New Dock.	6,970 ft.	590 ft.	26 ft. 6 in.

Length of wharves 5,970 ft.
15 2½ ton electric cranes in all.

	Length.	Width.	Depth.
Central Wet Floating Dock.	1,440 ft.	460 ft.	26 ft. 6 in.

Length of wharves 2,034 ft.
6 2½ ton electric cranes in all.

	Length	Width.	Depth.
North Wet Floating Dock.	1,640 ft.	820 ft.	13 ft. 4 in.

Length of wharves 3,797 ft.

Zeebrugge.

Harbour of Refuge. This is formed by a pier 8,160 ft. in length, with wharves of 25 to 36 ft. The six electric and ten steam cranes are being refitted.

Canal (connecting Harbour of Refuge with lock.)
Length 2,461 ft.
Width at water-line 150 ft.
With at bottom 365 ft.
Depth at low water 20 ft.

Lock.	Length 840 ft. Width 66 ft. Depth at low water 18 ft. (The sea-lock has been repaired.)
Inner Harbour.	Length 2,231 ft. Width at water-line 316 ft. Width at bottom 165 ft. Depth 26 ft.
New Locks.	Length 1,449 ft. Width at water-line 478 ft. Width at bottom 334 ft. Depth 26 ft. 4 in.
Bruges Canal.	Length 6¼ miles. Width at water-line 72 ft. Width at bottom 30 ft. Depth 26 ft. One 50-ton floating steam crane.

Part of this canal has wharves of a total length of 14 ft. 10 in. These wharves are furnished with cranes etc., belonging to private companies.

At present this canal has been emptied in order to raise the ships sunk in it, but vessels will shortly be able to enter it for unloading. The plant at Bruges was severely damaged during the war. The docks have still to be emptied and cleaned; in the meantime steamers with a draught of 24 ft. unload at the Mole.

Bruges.

East Dock.	Length 682 ft. 6 in. Width 275 ft. Depth 26 ft. Length of wharves 2,035 ft.
North Dock (or "Manœuvre" Dock).	Length 794 ft. Width 750 ft. Depth 26 ft. 3 in. Length of wharves 395 ft.

West Dock.	Length 1,772 ft. Width 295 ft. Depth 26 ft. Length of wharves 2,025 ft.
Semi-maritime Lock (connecting West Dock with Ostend - Bruges Canal).	Total length 565 ft. Length between gates 320 ft. Width of entrance 39 ft. Depth of entrance to Ostend Canal 15 ft. 6. in.
Old Docks.	Length 820 ft. Width 393 ft. Depth 20 ft. Length of wharves 1,213 ft. (Steamers of 171 ft. in length and 36 ft. in width can reach Bruges with a draught of 14 ft. (13 ft. 6 in in winter).
Plant.	At present lacking, but several movable electric cranes lifting from 1 ½ to 4 tons, together with a large 55-ton floating crane, will shortly be installed.

Ostend.

Tidal Dock.	Length of wharfage reserved for merchant vessels : 1,148 ft. Length reserved for government vessels : 574 ft.
Old Dock, (giving access to 1st and 2nd docks).	Length 180 ft. Width 38 ft. Depth at high water 18 ft. Depth at low water 15 ft.
First Dock.	Length 918 ft. Width 197 ft. Length of wharves 216 ft. Depth (low water) 18 ft. One 10-ton crane.

Second Dock.	Length 557 ft. Width 328 ft. Length of wharves 1,574 ft. Depth (low water) 15 ft.
Wood Dock, 3rd Dock.	Length 460 ft. Width 312 ft. Length of wharves 3 ft. Depth (low water) 12 ft.
Fishermen's Dock. (Tidal.)	Wharves.
Dry Dock.	Length 885 ft. Width 285 ft. Length of wharves 2,033 ft. Length available for use 328 ft, Width available for use 33 ft. Depth with blocks 164 ft. + 1 ft. 8 in.
New Wharf (Entrance, destroyed during the war, is under reconstruction).	Length 2,800 ft. Depth (low water) 34 ft. Depth (high water) 38 ft. One 3-ton electric crane, five 5-ton steam cranes, one large 50-ton crane.
New Dock (Nouvelle Cale).	Length available for use 440 ft. Width available for use 60 ft. Depth (low water) 16 ft. Depth (high water) 32 ft. (Ships of greater length than 440 ft. can enter the New Dock at high tide, when the lock-gates are open).
New Dock (Nouvelle Bassin).	Length of dock 2,500 ft. Width 300 ft. Length of wharf 5,000 ft. Width at entrance 58 ft. Depth 28 ft. Four 2-ton electric cranes; five 5-ton steam cranes.
New Wood Dock.	Length of wharves 4,500 ft. Depth 24 ft.

Nieuport.

The installations of this port were completely destroyed during the war, and their reconstruction is at present well advanced.

Brussels.

Antwerp is connected with Brussels by a ship canal of recent construction, of the following dimensions :
Length 47 km.
Width at surface of water 300 ft. (maximum).
Width at bottom 18 ft. (minimum).
Depth 19 ft. 6 in.

Dimensions of Docks.
Length 350 ft.
Width 48 ft.

Vergole Dock.
Length 2,300 ft.
Width 394 ft.
Width of entrance 52 ft.
Depth 21 ft.
One 10-ton electric crane.
10 electric cranes of various lifting capacities.

Junction Dock.
Length 1,968 ft.
Width 131 ft.
Width of entrance 39 ft.
Depth 11 ft. 6 in.
One 20-ton electric crane.
Four cranes of various sizes.

Boatmen's Dock.
Length 1,640 ft.
Width 121 ft.
Width of entrance 39 ft.
Depth 10 ft.
Two 2-ton electric cranes.

Louvain.

Connected with Antwerp by a canal 11.5 ft. deep.

	Length	Width	Delpht
Large Dock.	675 ft.	91.5 ft.	11.5 ft.
Small Dock	382 »	90.5 »	11.5 »
Beerkoom Dock.	623 »	66 »	11.5 »

B. **Strength of Belgian Mercantile Fleet.**

Above	5,000 t. gross		30 vessels	(174,858 t. gross)
»	4,000 »	and less than 5,000 t.	17 »	(48,773 »)
»	3,000 »	» 4,000 t.	18 »	(62,302 »)
»	2,000 »	» 3,000 t.	40 »	(115,322 »)
»	1,000 »	» 2,000 t.	36 »	(85,334 »)
»	500 »	» 1,000 t.	27 »	(14,208 »)
Under	500 tons		23 »	(5,247 »)

Total: 200 steamers (496,106 t. gross)
9 sailing ships with auxiliary motors (6,780 t. gross)
4 sailing ships (3,158 t. gross)
213 ships (506,044 t. gross).

Belgian passenger ships.

(Belgian Government) Above 23 knots and turbine.
SS. Jan Breydel 1,767 tons.
» Pieter de Coninck 1,767 tons.
» Princesse Elizabeth 1,767 tons.
» Stad Antwerpen 1,384 tons.
» Ville de Liège 1,766 tons.

Above 20 knots and below 23 knots.
SS. Princesse Clementine 1,474 tons.
» Princesse Henriette 1,094 tons.
» Rapide 1,195 tons

Above 13 knots.
SS. Albertville 7,745 tons.
(Cie. Belge Maritime du Congo).
» Anversville 7,694 tons.
(Belgian Congo Service).

Above 14 knots.
SS. Rubis (J. Cockerill & Co. London) 633 tons.
» Saphir (J. Cockerill & Co. London) 633 tons
» Topaze (J. Cockerill & Co, London) 634 tons
» Gothland (Red Star Line, New York Line) 7,660 tons.
» Samland (Red Star Line, New York Line) 9,748 tons.

Above 11 knots.

SS. Clara Blumenfeld. Erfurt Sydney, Greiffenfels, Bonnenfels, Itauri.

Builders of Steel Ships, Marine Boilers and Repair Works.

Antwerp.

Antwerp Engineering Co., Ltd., Antwerp (repairs).
Cockerill, Hoboken (builders).
Antwerp Engineering Co., Hoboken (builders).
Belgian Ship-repairing Co. (repairs).
Former Kruger Works (repairs).
Gutherie Murdock & Co. (repairs).
Mercantile Marine Engineering Co. (repairs).
Biliard Creighton & Co.'s Repair Works (repairs).

Boom.

V. van Laume & Sons, Baesrede (builders & repairers).
G. Stockers & Co.'s Ship Works (builders & repairers).
Garels Bros. & Co.'s Factory (machinery).

Hoboken.

Grandes Chaudronneries de l'Escaut Co. (boilers).

Ghent.

Anglo-Belgian Naval Construction Co. (repairs).

Ostend.

Letzer & Co. (repairs).

C. **Freights.**

a) *Increase in passenger freight.* The cost of transporting passengers has increased enormously since the pre-war years.

b) *Increase in goods freight.*

Timber from the North.	1914 (in francs) *per standard.*	1920/1921 (in francs) *per standard.*	
From the Baltic to Antwerp	30/35	900/200	
From Norway to Antwerp	18/20	500/110	90
Coffee from Rio and Santos to Antwerp per ton.	40	200/120	100
Fruit from Spain and Italy to Antwerp	25	350/150	100

Grain from the Argentine to Antwerp	25/30	250/120	80
Northern U.S.A. to Antwerp	8/10	200/100	
Provisions U.S.A. to Antwerp	15/32	400/300	100
Cotton New Orleans to Ghent, Antwerp	80/100	560/300	90
Wool Australia to Antwerp	90/100	800/600	400
Wine Bordeaux to Antwerp	20/25	150/80	60
Tobacco U.S.A. to Antwerp	50/60	600/550	
Java to Antwerp	80/100	750/600	
Sumatra to Antwerp	140/160	1300/1200	
Petroleum America to Antwerp	0.02 per litre	0.32/0.25 p. l.	
Antwerp to Congo.			
Coal	22.50	110/100	
Coke	30.00	165/150	
Salt	40.00	160/140	
Congo to Antwerp.			
Rubber	28/30	385/300	
Copal	28/30	275/230	
Cocoa	35/38	325/300	
Palm Oil	35/38	375/350	
Coffee	25/30	325/300	
Pepper	25/30	425/400	
Raffia	28/30	650/580	
Wood	28/30	350/325	
Rice	28/30	320/300	
Ivory	28/30	850/800	
Spain to Antwerp.			
Ore	10/12	140/50	30
England to Antwerp.			
Coal	4/5	140/25	16

D. **Bunker coal.**

The price of bunker-coal in Belgian ports has undergone a considerable increase since the pre-war period. During the years 1919 and 1920, English coal was commonly sold at 400 to 525 francs per ton, while Belgian coal, which was for the most part of inferior quality, was quoted at 165 to 250 francs.

Belgian briquettes were sold at 170 to 200 francs according to season, and, as a general rule, owners only took in at Antwerp such bunker-coal as was absolutely indispensable.

Towards the end of 1920 German coal was sold in the market, and was then quoted at 165 to 260 francs. This coal was, as a rule, extremely unreliable, and it was almost invariably of doubtful quality, as was the majority of German coal delivered to Belgium under the terms of the Peace Treaty. Good quality Westphalian bunker-coal, such as was usually sold in Belgian ports before the war (consumption 1 million to 1 ½ million tons per annum), is unobtainable. To sum up: there is little demand for the German coal offered at present, and preference is always given to English coal, the quality of which, although inferior to that of the pre-war period, is none the less reliable.

The English coal used is especially "unscreened Durham and Northumberland" and the various grades of Welsh coal, pit-mouth, large or small, mixed in various proportions.

Mixed Belgian and English coal is commonly offered for sale, but shipowners very often hesitate to purchase this kind of bunker-coal, as they are unaware of its nature and actual quality.

During the last months of 1920, American coal was imported in comparatively large quantities; this coal is satisfactory as bunker-coal, although 20 % more of it than of English coal must be consumed to produce the same amount of energy. The price of this coal varies from 350 to 175 francs

IV.

MOTOR AND AIR TRANSPORT.

Motor Transport.

As an experiment, the railway authorities are using 2 to 4 ton motor-lorries in place of horse-vans for the delivery of goods in the Antwerp area. This experiment will very shortly be extended to the van distribution service in Brussels.

Air Transport.

The question of air transport for certain classes of postal packages will shortly be considered.

BOLIVIA.

The geographical situation of this Republic, in the centre of South America, left since 1879 without an outlet to the sea, is a hindrance to her commercial development, and adds greatly to the cost of maintaining her trade relations with the other nations of the Old and New World.

The lack of a port which could serve as a base for her commerce—either for the export of her natural and manufactured products, or for the import of those offered to her by oversea countries—forces the Republc of Bolivia to depend upon the good-will of her neighbours and to conclude with them commercial treaties which may prejudice her economic and financial interests.

All the Bolivian Governments, however, are working hard on the construction of railways, often at great sacrifice, for the sole purpose of establishing connections with the railways running from every direction up to Bolivia's frontiers, *viz:*

In the direction of Chile, the railway belonging to the English company starts from Antofagasta and runs to Oruro, a mining town in the centre of Bolivia.

Another line runs from the Port of Arica to La Paz. This railway was constructed as the result of a Chilian-Bolivian treaty, which grants a reduction of the freight tariffs for natural and manufactured products on this line, as compensation for the financial assistance lent by Chile.

In the direction of the Argentine, the Bolivian railways are soon to be connected with the Central North Argentine Railway, which is one of the most important lines in that country, and starts from its capital, Buenos Aires.

On the west, Bolivia is connected with Peru by the railway from Mollendo, a Peruvian port, and by the boat services on Lake Titicaca.

Finally, the Bolivian railways are endeavouring to establish connections with those of Brazil; the Madera-Mamore line almost reaches Bolivian territory and will soon be connected to the Brazilian system.

Within Bolivia, a number of State lines are being constructed out of the public funds. This work is being carried on without interruption under direct contract with various firms, such as Speyer & Co. and the "National City Bank" of New York. These lines appear in the following table:—

I

RAILWAYS.

In 1920 the Bolivian railway lines in operation and under construction, covered 2,261 kms., the details being as follows :—

In operation :

The Antofagasta and Bolivia Railway Company Limited, Antofagasta-Oruro (925 kilometres, not including secondary and branch lines).

(Sec. Boliviana)	486	km.		
Viacha-La-Paz	29	»		
Ramal-al-Kenko	8	»		
			523	km.
Compagnie " Huanchaca " de Bolivie.				
Branch of the main line Antofagasta-Uyuni (without State guarantee)	38	»	38	»
The Bolivia Railway Company (with guarantee)				
Viacha-Oruro	202	»		
Rio Mulato-Potosi	174	»		
Oruro-Cochabamba	205	»		
Uyuni-Tupiza-Antocha	90	»		
			671	»
" Luz y Fuerza Cochabamba " (with guarantee).				
Cochabamba-Vinto.	18	»		
Cochabamba-Arani.	63	»		
			81	»
Arica-La Paz Railway.				
Arica-Alto from La Paz, 439 kilometres.				
Sec. Boliviana.			233	»
Simon I. — Patino (without guarantee).				
Machacamarca to kilometre 60	60	»		
Branch line of the Corocoro (State property)				
Branch line from the main line of Arica. .	8	»		
Potosi-Sucre Railway (State property).				
Section open to traffic	495	»		
Yungas Railway (State property).				
Section to be opened to traffic	35	»		
The Peruvian Corporation Limited (without guarantee).				
Guaqui-La Paz	98	»	696	»
Total			2.242	»

In course of construction.

Simon I. — Patino.		
Brought forward . . .		2,242 km.
Machamarca-Uncia		44 »
State Lines.		
La Quiaca-Tupiza	100 km.	
Potosi-Sucre	128.5 »	
La Paz-Yungas (about)	91 »	
Uyuni-Tupiza (Section to be constructed).	104 »	
		423.5 »
Total		467.5 »

Summary.

Total in permanent and provisional operation	2,242 km.
In course of construction and to be constructed	467.5 »
Total	2,709.5 km.

The fractions have been made up to the next larger unit.

Lines belonging to the Bolivian Railway Company.

Up to June 30 of this year, the Bolivian Railway Company spent on its various lines £6,589,001/7/2, making a total, with guaranteed interest, of £7,339,001/7/2.

In the construction of different lines during the year 1919 and the first half of this year, the Company has spent the sum of £185,884,12/10 on its own account, without any State responsibility. A calculation of expenditure up to June 30, 1920, shows that the construction of railways has cost £6,589,001/7/2., while the bonds issued have brought in only £ 5,500,000. The surplus of expenditure, amounting to £1,089,001/7/2, was met by another issue of bonds exclusively by on the Company's account. The Company has, moreover, advanced another sum representing the value of material on the spot and in transit amounting to £172,633/19/11.

The issue of first mortgage bonds produced a sum of £3,750,000 which, with a discount of 20%, gave a net yield of £3,000,000. Second mortgage bonds, which represent the same value at par, produced a sum of £2,500,000.

According to the report of the fiscal inspectors of railway accounts, the available sum at the banks for the payment of interest on first mortgage bonds, up to June 30 of this year, would be £282,129/16/6.

The total amount on December 31, 1919, was £ 288, 031/17/9; that is to say, it has decreased in the first half year of 1920 by £4.902/1/3.

Viacha-Oruro Line.

This line has been working regularly. Net expenditure amounts to £ 1,220,283/18/2. 60 % of this sum corresponds to first mortage bonds guaranteed by the State, upon which interest is paid at the rate of 5 % annually.

Rio Mulato-Potesi Line.

No construction work of any importance on this line has been undertaken this year. It has maintained a regular service.

In 1919, the traffic was as follows :

Passengers	12,608	Bs.	91,802.89
Luggage and parcels	362	»	27,608.65
Goods	15,749	»	410,048.36
Express trains, telegrams, etc.		»	10,688.15
		Bs.	540,098.05

Monthly average	Bs.	46,008.17
Monthly average in 1918	»	52,908.46
The difference of	Bs.	7,900.29

is due to the decrease in the tonnage of goods carried, which in 1918 amounted to 20,392 tons, and in 1919, to 15,749.

Oruro-Cochabamba Line.

In 1919, the traffic was as follows :

Passengers	81,669		Bs.	396,410.08
Luggage and parcels	862	Tns	»	71,559.64
Goods	29,321	Tns	»	823,108.19
Express trains, telegrams, etc.			»	11,558.28
Total			Bs.	1,302,636.19

or a monthly average of Bs. 108,553.01 against Bs. 94,662.51 in 1918.

Oyuni-Alucha Line.

In the year 1919, the traffic on this railway was as follows :

Passengers	17,812	
Luggage and parcels	362	tons
Goods	17,224	»

Guaqui Railway.

Traffic on this railway in the year 1919:

Passengers	52,708	
Luggage and parcels	361	tons
Goods	46,169	»

Potosi-Sucre Line (Under construction).

The cost to the National Treasury up to date has been Bs. 4,540,000.

Atocha—Tupiza—La-Quiaca Line.

This line, which is to connect the Argentine with the Bolivian system, is almost completed.

The cost of construction up to date to the Vezin firm is Bs. 4,079,862.36.

Cochabamba Santa Cruz Line (In course of construction).

It is intended to connect this line with the Brazilian Railways, as explained at the beginning of this report.

La-Paz-Yungas Line.

The cost of construction of this line to the present date has been Bs. 11,694,970.61. All the money received has been paid to the construction company.

II

RIVER NAVIGATION.

Bolivia also possesses a very large number of navigable rivers. Only the most important of these, however, are used for the transport of her products to the principal Atlantic ports, and particularly to her neighbours, Brazil, Paraguay, and Peru.

The large Bolivian rivers, the Beni, the Mamore and the Madera are the principal tributaries of the great Amazon River, which flows into the Atlantic Ocean. They keep us in touch with Brazil, with which country we share the use of all these rivers.

With Peru, we share the navigation of the rivers Rio Mapiri-Madre de Dios. One of the reasons why we have established a common river navigation service with our neighbour, is that for years, both in this country and in Brazil, the banks of these rivers have produced rubber, as is the case throughout South America.

Finally, towards Uruguay, we have the rivers El Plata and the Pelcomayo, which flow through Bolivia and Paraguay into the South Atlantic.

The future development of Bolivia depends on the development of navigation on the rivers already mentioned and on many others.

III

MOTOR TRANSPORT.

Whilst work on the railways in Bolivia has been proceeding, motor transport services have been established, as in the Argentine, in the Southern section from Sucre to Potosi. From Cochabamba to Santa Cruz, in the districts where there is more commercial activity, passenger services have been introduced.

ANNEX.

CONVENTION REGARDING COMMERCIAL TRAFFIC BETWEEN CHILE AND BOLIVIA.

Reduction of Freight Rates.

M. Albert Gueirrez, Envoy Extraordinary and Minister Plenipotentiary of Bolivia, on the one hand, and M. Emilio Bello Cobesilo, Minister for Foreign Affairs of Chile, on the other hand, both duly accredited by their respective Governments, having met on October 20, 1904, at Santiago de Chile in the office of the Minister for Foreign Affairs, agreed as follows:

Whereas the Governments of Bolivia and Chile, when signing the provisions contained in the Treaty of Peace, agreed to substitute for the Customs exemptions requested by Chile in favour of her natural and manufactured products, facilities which would not run counter to the desire of Bolivia to preserve her commercial liberty intact,

And whereas these two Governments agreed to insert, in a separate instrument, the provision set forth in the fifth paragraph of Article 3 of the aforesaid Treaty, regarding trading facilities to be specified in subsequent Conventions,

On the railways constructed in Bolivian territory, the natural and manufactured products exported by Chile to Bolivia will be granted, under the guarantee of the Chilian Government, a minimum reduction of 10 per cent. on the freight rates in force on the aforesaid railways.

The Bolivian Republic will take the necessary steps to ensure that the same advantage is granted to Chilian products on the Bolivian section of the railway from Antofagasta to Oruro.

The special Conventions which the Governments of Bolivia and Chile will conclude with regard to the construction of railways, in conformity with the provisions of Article 3 of the Treaty of Peace, and the contracts relating to the construction and operating of the various secondary lines of the country, will accordingly include undertakings to concede the aforesaid reduction to Chilian products.

In faith of which the Envoy Extraordinary and Minister Plenipotentiary of Bolivia and the Minister for Foreign Affairs of Chile have signed the present Protocol in duplicate, and have affixed their respective seals thereto.

(Signed) ALBERT GUEIERREZ.
EMILIO BELLO COBESILO.

BRAZIL.

In conformity with the scheme of work of this Conference, we are submitting a short statement dealing with the transport situation in Brazil considered from every point of view. For this purpose it is desirable to begin with a general description of the country, regarded from the standpoint adopted by this Conference. This preliminary survey will reveal the weighty reasons which have induced Brazil to seek here the solution of the important problems with which it is proposed to deal.

* * *

Situated in South America, Brazil, owing to her special geographical conformation, presents at first sight the appearence of a continent enclosed within a continent. Brazil is almost entirely surrounded by water, the largest block of her territory being welded on its western side to the foothills of the Andes range by a line of low ridges. Near the isthmus constituted by these ridges, the headwaters of the great rivers, the Amazon and the Paraguay, almost meet. From this region they flow swiftly, one northward and the other southward, along the vast valleys by which their waters, ever increasing in volume, find their way to the Atlantic, into which they hurl themselves, excavating the gulfs which form the vast estuaries of the Amazon and the Rio de la Plata. Thus we see emerging like a gigantic island, with an average altitude of 1,000 meters, the Central Plateau of Brazil, around which extend the low-lying lands of the sea-coast, the immense level of the Amazon basin, and the plains of the Paraguay, Parana and Uruguay valleys. On the left bank of the Amazon the Brazilian territory rises, forming the southern slope of the plateau of the Guianas.

To complete this preliminary outline of Brazilian geography, it is only necessary to remember that the country borders on all the South American Republics, with the exception of Chile and Ecuador. The following are her boundaries : on the north, French, Dutch and British Guiana and Venezuela ; on the north-west, west and south-west, Colombia, Peru, Bolivia, Paraguay and the Argentine Republic ; on the south Uruguay ; on the south-east, east and north-east, the Atlantic Ocean. Thus you will see how Brazil is a country naturally destined, by her geographical situation, to play an extremely important rôle in the countless questions of transport, international communications and transit.

In order, however, to get a clear idea of this rôle, we must complete, by some other characteristic touches, the survey of the orography and hydrography of Brazil. The Central Plateau of Brazil is connected to the eastern slope of the Andes, and is buttressed by a system of mountain chains, the framework of which is formed by two principal ranges. The first of these is near the sea, which it borders for a long distance between the 30th and 19th parallels, and then runs, further from the coast but still in a northerly direction, as far as the gap made by the Sao Francisco River, beyond which this chain reappears in the form of the fragment which was its highest summits in the State of Ceara ; such is the great eastern mountain chain, which includes the Sierra do Mar and its northern extensions. The other feature, the central range—*i.e.*, the Sierra Central, —which joins on to the first near the sources of the Sao Francisco, penetrates into the interior of the country and includes the mountains in the States of Minas-Geraes, Goyaz, Bahia ; it terminates very nearly in the centre of the longest north-to-south diameter of the Central Plateau, in which its slopes gradually merge and disappear. These two main features of the Brazilian plateau determine the natural conformation of its river system. On the two sides of the central range and of an imaginary line prolonging this range across the plateau, the waters follow three main slopes : the northern slope, the southern slope and the north-eastern Atlantic slope.

From the plateau of Formoza, at the site chosen for the future Federal Capital of Brazil, these three slopes are simultaneously visible. The Amazon receives the watercourses which flow towards the north ; those which take a southerly direction form the rivers Paraguay, Parana and Uruguay, and combinein the estuary of the Rio de la Plata ; while the waters which flow north-east towards the Atlantic constitute the basin of the Sao Francisco and the basins in the State of Maranho, including Parahyba and Gurupy valleys.

To these three main river systems there must be added, on the one hand, the great secondary watercourses such as the Jequitinhonha and the Parahyba, which plunge straight from the heights of the Sierra do Mar to the low-lying coastal lands, where they flow gently till they reach the sea ; and, in the extreme north, the southern part of the basin of Oyapock ; and, in the extreme south, the very remarkable hydrographic system of the State of Rio Grande do Sul. There are thus the most varied types of rivers in Brazil ; rivers in the plain, whose waters encounter no obstacle such as the Amazon ; rivers in the plateau, rich in magnificent waterfalls, like those of Iguassu, of Paulo Affonso, of the Sete Quedas ; and, finally, rivers of mixed type, which appear first as waterfalls and then meander slowly towards the sea. A great number of the first class, the rivers in the plains, are navigable throughout their courses ; those of the second class are navigable in their longest stretches, both when they flow evenly across the plateau, and when, having plunged down its abrupt slopes, their waters once more flow calmly, deeply furrowing the soft soil across which they wend their way to the sea. The rivers of the last class are only available for navigation in their lower reaches. It may therefore be said without exaggeration that Brazil possesses a natural system of communication which unites her remotest districts, though these are in some cases as much as 6,000 kilometres apart.

While pointing out the advantages of this natural system of transport routes, we have not forgotten that it by no means fulfills the conditions requisite for a truly industrial system of transportation. It is a natural marvel which requires to be completed by much human handwork before it can fully meet either present or future economic requirements. Much of this work has already been carried out ; some rivers have been improved with a view to navigation ; railways have been constructed in order to connect the navigable portions of others or to bring remote valleys within reach. It is necessary, however, to continue constructing fresh railways, high roads available for motor traction, and canals connecting the river routes. In many places the beds of the canals which must be constructed have already been dug by nature in the form of deep, broad and long ravines, like those which occur in the Central Plateau. In this connection it may be observed that a canal 4,800 metres long—as d'Orbigny proposed—in the marshy region where the last tributaries of the Amazon merge with the first tributaries of the La Plata, would provide Brazil with a gigantic continuous canal which would connect these two great basins and serve the whole central portion of South America. That is how man can assist nature by completing her marvellous work.Some of the work suggested may indeed prove difficult. But when we compare the efforts which it would require with the greatness of the results which it would yield, and consider the physical conditions—which are certainly in many cases difficult but on the whole favourable—there can be no doubt that it would be possible, without excessive exertion, to provide Brazil with a system of transport routes which, by its extent and situation, would possess a value not merely national or continental, but—we say it in no spirit of boastfulness—world-wide. It was to demonstrate this fact that we have submitted this survey of the geographical conditions of our country.

⁂

You have seen that Brazil—situated in the heart of South America—provides the chief connecting links between the various Republics which surround her. Let us consider her now in her relation to other continents.

Thanks to the Atlantic, on which she has a coas-tline of more than 6,000 kilometers, Brazil may be regarded as a neighbour of the Old World. By the trans-oceanic routes, which have their terminal at various points along her vast littoral, she is connected even with the most distant countries. She is thus in direct connection with North America and, *via* the Cape of Good Hope, with the Far East ; the shortest distance between Europe and South America is that from Cape St. Vincent to Cape St. Roque, the most easterly point in Brazilian territory. Pernambuco is nearer than any other South American port to the European ports. Again, opposite the Brazilian coast, the African shore juts out, and these two coasts approach each other so closely that the interval between the Old and New Worlds can now be crossed in less than three days. Thus, in considering the relative position of the ports of Dakar and Pernambuco, one cannot but think of the relations which will be maintained through them, in the future, between the African and the South American railway systems. It may indeed be foreseen that, for purposes of rapid transportation, these two railway systems, united by the sea route Pernambuco-Dakar, will one day be permanently in communication with each other. The railway, which will unite Western and Northern Africa, will thus have as its South American extensions two railways which will start from Pernambuco and connect that city, one with Monte Video, and the other, across Bolivia, with Chile and Peru by means of the railways terminating at the ports of Antofagasta and Molliendo. Owing to the numerous waterfalls, electric traction can be employed on a large scale on these railways. Thus, it is clearly through Brazil that the best southern communications can be established between the two great oceans which wash the east and west coasts of America; and that the Republics of the Plata and those of the Pacific can be kept in closest touch with southern and western Europe.

It would be superfluous to emphasize the importance of the international position of Brazil in regard to the world problems of transit and transportation. This observation leads us to note the natural conditions upon which Brazil bases her policy in regard to transport, transit, and communications between the different nations. This policy may be summed up in the following words: to respect freedom of navigation and transit over routes forming part of the general international system, and at the same time to respect the sovereignty of each State over the waters and the routes which are an integral part of its own territory.

We will now supplement these general remarks by the following notes on special points.

I.

RAILWAYS.

The rails of the first Brazilian railway were laid in 1852; this first system started from the port of Maua in the bay of Rio de Janeiro. Two years later the rail had reached the foot of the Serra of Petropolis, which it later climbed, following the course of the Piabanha river. Later, it was extended towards the city of Entre Rios, thus approaching the State of Minas Geraes.

The Central Railway.—In 1858 the first section of another railway, which was later to cover a considerable area, was inaugurated: the Don Pedro II Railway, which is today the Central Railway of Brazil.

Thus originated the two large systems which serve and connect the States of Rio de Janeiro, Mines Geraes, Sao Paulo, and Espirito Santo.

The Central Railway, extending to the north-west into the State of Minas Geraes, connects the capital with a large zone of supreme economic importance, rich in minerals (manganese, gold, etc), coffee, maize, cereals, wood, livestock of all kinds, etc. This railway also connects Rio de Janeiro with the great river Sao Francisco, which it reaches at the town of Pirapora, after covering 1,007 km. 357. The importance of this point, which is at present the terminus, is steadily increasing ; it is a junction of rail and water communication between the valley of Sao Francisco and the Atlantic Coast, and will at no distant date become one of the centres of connexion between that valley and the valley of the Amazon. This great artery, which serves the principal towns of the State of Minas Geraes, is known under the name of "Linha do Centro". Extensive engineering operations have been necessary to enable it to cross several chains of mountains. At a distance of 65 km. from Rio de Janeiro it begins the ascent of the Sierra do Mar, over which it passes by somewhat steep gradients (maximum 0.018 metres), passing through a tunnel 2,237 metres in length, and coming out into the higher valley of the Parahyba river.

At Miguel Burnier, that is to say, at a distance of 497 km. 931 from Rio de Janeiro, it reaches an altitude of 1,126 metres. From that point there is an almost continuous descent to Pirapora (472 metres above sea-level), where the line terminates after following the Rio das Velhas, a tributary of the Sao Francisco, and describing numerous curves (minimum radius of curvature 101.03 metres). The guage is 1 m. 60 as far as Lafayette, that is to say, to the kilometre 462.278 (centre of important iron mines). From Lafayette to Miguel Burnier, the line is of two guages (1 m. 60 and 1 m.). From Miguel Burnier to Pirapora, that is to say, over a distance of 508 km. 009, the guage is 1 metre (maximum gradient 0.020 m.).

The other main artery of the Central Railway connects Rio de Janeiro with the capital of the State of Sao Paulo. It bifurcates at kilometre 108 ; one line — the Linha do Centro — of which we have just given a summary of the principal characteristics, runs northwards ; the other follows a south-westerly direction. The latter was commenced in 1864, and reached its terminus, the " Norto " station at Sao Paulo, in 1875. It covers a distance of 390 km. from the junction of Barra de Pirahy, which makes a distance of 498 km. from Rio de Janeiro to Sao Paulo, following the valley of the Parahyba. The guage is 1 m. 60 over the whole distance, and the highest point (altitude 774 metres) is at 473 km. from Rio de Janeiro.

As regards local lines, we must note the two which serve the suburbs of Rio de Janeiro ; one of 34 km. the other of 1 kilometre in length. There are also three branch lines at Minas Geraes, namely : that of Ouro Preto, that of Bello Horizonte, and that of Santa-Barbara. The first connects the Linha do Centro at the station of Miguel Burnier (497 km. from Rio) with the town of Ouro Preto, the former capital of Minas Geraes ; the second starts from General Carneiro (590 km. from Rio) and terminates at Bello Horizonte, the capital of that State ; the third joins the Linha do Centro at kilom. 582.424 (Sabara) and covers a distance of 76 kilom. as far as Santa-Barbara, its present terminus.

The two large systems of the Central Railway—Linha do Centro and Ramel de Sao-Paulo — are completed by a system which was originally an independent railroad, but was bought by the Federal Government and became the third artery of the Central Railway. It is known as the " Linha Auxiliar ".

The guage on this system is 1 metre ; it starts from the station Alfredo Maia, that is to say, at 2,222 metres from the first station of the original line of the Central Railway, and after covering a distance of 240 km. 108, following the course of the Parahyba, it terminates at Porto Novo in the State of Rio de Janeiro.

At Porto Novo it connects with the Leopoldina Railway, which we shall have occasion to refer to later.

Two branch lines of this system should be mentioned : one starting from Costa Barros (km. 23.183) and terminating at Thonazinho (km. 26.537), the other starting from Governador Portella (111 kilom. 730) and terminating at Juparana (157 km. 993).

A local system (89 kilom. 993) starts from the latter town and terminates at Barboza Gonçalves ; its guage is 1 metre, and the highest altitude, 567 metres, is reached at kilom. 202.775. This system has a branch line (guage 1 metre) which starts from the town of Valença (km. 182.821) and terminates at Barra Longa, that is to say, after covering a distance of 54 km. 095.

We have given a rapid summary of the characteristics of the Central Railway of Brazil — the most important railway system of our country — which connects three large States of the Federation, and which, through its connexions with other systems, is already, and will become to a greater extent, the pivot of communication between the north, the centre, and the south of the country.

We have shown how the Central Railway of Brazil connects the basin of Sao Francisco with the capital, and pointed out that at no distant date this line will also directly connect Rio and the Amazon.

Let us now see how this system is connected with other railway systems.

Compania de Estradas de Ferro Federaes Brasilêiras. — In 1881 a railway was commenced at Cruzeiro (State of Sao Paulo), which, under the name of " Minas à Rio ", became in 1884 the connecting link between the Central Railway and an important stock-raising zone. This railway (guage 1 metre), which terminated at the town of Tres Coraçoes, was bought by the Federal Government. Its junction (Cruzeiro station) with the Central Railway is on the line which connects Rio with Sao Paulo (252 km. 155). This railway is now included in the large system known as " Rêde Sul Mineira ", as it serves more especially the south of the State of Minas Geraes.

The Rêde Sul Mineira line is composed of several small railways which were bought by the Federal Government and later taken over by the " Compania de Estradas de Ferro Federaes Brasileiras " (January 2nd, 1902). It is composed of three main lines : Cruzeiro to San Sebastiao de

Paraizo (532 km. 571), Soledade to Sapucachy (269 km. 529) ; Soledade to Passa-Tres (324 km. 788).

As may be seen, Soledade is an important point of bifurcation. It is situated at kilometre 89.394 (altitude 865 metres) on the Cruzeiro-San Sebastiao de Paraizo line.

The Rêde Sul Mineira line is connected to the Mogyana line by a small branch line which starts from the station of Guaxupé (434 km. 770).

The Mogyana line which serves an extremely rich zone of coffee plantations in the State of Sao Paulo, therefore directly connects the south of Minas Geraes with the port of Santos.

The Sapucachy-Soledade line serves a highly productive industrial and agricultural zone. The Soledade-Passa-Tres line joins the Central Railway at the station of Barra de Pirahy (284 km. 465), after crossing the Serra da Mantiqueira and attaining an altitude of 1,271 metres (maximum gradient 0 m. 015 ; minimum radius of curvature 150 metres).

The Oeste de Minas Railway.—Part of the west of the State of Minas Geraes is served by the Oeste de Minas Railway, which belongs to the Federal Government and was commenced in 1880. This system connects with the Central Railway at the station of Sitio (altitude 1,040 metres) at a distance of 363 kil. 094 from Rio de Janeiro on the Linha do Centro.

The section, which begins at Sitio, terminates at the junction of the Paraopeba and Sao Francisco rivers ; it covers a distance of 601 km. 800. This system serves districts in which stock-raising and the cultivation of coffee, cereals, sugar-cane and cotton have attained a considerable development. The gauge is 0 metres 76 ; the maximum gradient is 0.022 metres and the minimum radius of curvature 72 metres. At kilometre 202.109, a branch line of 48 km. commences, and terminates at Ribeirao Vermelho, which is also the junction of two lines, one of which, 9 km. 311 in length (different gauges), connects at Lavras with the branch line, which, starting from the latter town, joins the Central Railway at Barra Mansa (Rio-Sao Paulo line), that is to say, after covering a distance of 285 km. 251. From Barra Mansa, a line of 62 km. 400 extends to Angra des Reis, a small harbour of the same name on the Atlantic.

The importance of the other line which starts from Ribeirao Vermelho is due to the fact that it connects the States of Minas Geraes and Goyaz. Its terminus, the town of Formiga (142 km. 100) is the railhead of the Goyaz Railway, of which we shall speak later. Formiga is also the railhead of a small branch line of 34 km. in length which terminates at Etapecerica.

We must further mention two small branch lines which start from Barra Mansa, one 51 km. 600 in length, terminating at the town of Cedre, and the other 62 km. 004 in length, terminating at the town of Capivary.

Finally, we must refer to the important branch line which connects the Sitio-Paraopeba system with the capital of the State. This branch line starts from Divinopolis (355 km. 170 from the station of Sitio) and terminates at Bello-Horizonto, after covering a distance of 155 km. 185f A small branch line leaves it at km. 77.466 and connects with the town o. Para (27 km. 601).

A small branch line also leaves the Sitio-Paraopeba line at km. 96.432 and connects Chagas Doria with Aguas-Santas.

We have thus seen how the capital is connected with an extremely rich district in the State of Minas Geraes.

The Leopoldina Railway Co. Ltd.—The north of this State is served by the "Leopoldina Railway Co. Ltd.," one of the branch lines of which starts from Porto Novo, which, as we have said above, is a junction on the Central Railway. This system, known under the name of Linha do Centro, covers a distance of 369 km. 603 (gauge, one metre). Its terminus—Saude— is situated on the river Doce. Several important towns of Minas Geraes are served by this system. A small branch line leaves it at km. 7.524 and connects it with another line, 178 km. 665 in length, starting from Nictheroy (capital of the State of Rio de Janeiro in the Bay of Rio) and terminating at Macuco on the river of the same name. There was much bold construction work involved in the building of this railway (gauge, one metre). The first part of the line, as far as Cachoeira, is across a marshy plain. At Cachoeira it begins climbing (maximum gradient 0 metres 083), reaching, the summit after covering a distance of 94 km. The line then follows the valley of the Bengala in a series of short curves (minimum radius of curvature 40 metres) as far as Novo Friburgo, a summer resort much frequented by the inhabitants of Rio.

This line is prolonged by a branch which leaves Cordeiro and reaches the Parahyba at Portellas.

Another system of equal importance starts from Porto das Caixas (on the Nictheroy-Macuco line) and terminates at Macahé (a small harbour situated at the mouth of the river of that name) covering thus a distance of 146 km. 494. There is a small line 34 km. 512 in length which connects Macahé with a very fertile zone, and terminates at the town of Glycerio. It may also be added that the river Macahé is navigable for a distance of 78 kilometres. Macahé is, therefore, an important junction of communications. The cultivation of sugar-cane, cereals and cotton is much developed in this district. Another system, starting from Macahé, connects it with the town of Campos, covering a distance of 96 kilometres 757 (gauge, one metre ; minimum radius of curvature 160 metres ; maximum gradient 0.015 metres). A branch line, 57 km. 440 in length, connects this system with the Mancol de Moraes district.

Campos is, after the capital, the most important commercial city in the State of Rio de Janeiro. It is situated on the right bank of the Parahyba river, which at this point is 300 metres broad. The town of Campos is the central point of an extremely prosperous agricultural region. A small line, known as "Campistao" (32 km. 320) connects Campos with Sao Joao de Barra, a small harbour situated at the mouth of the Parahyba river. Two small branch lines connect Campos with Altafona (42 km. 049) and Colomins (13 km. 730).

Finally, two important systems start from Campos, one of which extends northwards and connects the State of Espirito Santo with the capital, while the other follows a westerly direction and connects Campos directly with the State of Minas Geraes.

The system which serves the State of Espirito Santo is divided into four sections. The first, from Campos to Murundu, which is also a point of bifurcation, is 50 km. 458 in length; the second (20 km. 626), from Murundu to Santo Eduardo on the Itabapoana; the third (93 km. 230), from Santo Eduardo to Itapemirim on the river of that name (State of Espirito Santo); the fourth (158 kil. 856), from Itapemirim to Victoria, capital of the State of Espirito Santo, and one of the best harbours in Brazil.

From Itapemirim (a district which is chiefly agricultural) a branch line of 146 km. 200 in length extends at present as far as Espera Feliz and connects with a small line which terminates at Castello at a distance of 21 km. 400 from the junction (Coutinho).

We have already said that the station of Murundu is a point of bifurcation. It is, in fact, the railhead of a lineof 108 km. 746, which terminates at the town of Purciuncula, in the north of the State of Rio. A small branch line (33 km. 536) connects this line, at the station of Patrocinio, with another line, of which we shall speak later. Let us now consider the other system which starts from Campos in the direction of the State of Minas Geraes. This line, which follows the course of the Parahyba, connects Campos with the town of Sao Fidelis, situated on the right bank of the Parahyba, and terminates at Miracema. The gauge is one metre; the maximum gradient is 0 metre 025, and the minimum radius of curvature 101 metres. A small branch line (17 km. 738) connects this line with the Recreio-Manhuassu system. The station of Recreio is situated at km. 67.029 of the Linha do Centro which we have described above. This system (Recreio-Manhuassu) is 266 kil. 540 in length; mention should also be made of a small branch line (17 km. 638) which connects it with the town of Sao Paulo (State of Minas Geraes).

At the beginning of this description of the Brazilian Railways we stated that our oldest line (1852) started from Maua, a small harbour in the Bay of Rio de Janeiro. This railway was taken over by "The Leopoldina Railway Co. Ltd." and is part of a section which terminates at the town of Sao José de Rio Preto (State of Rio de Janeiro), after covering a distance of 91 km. 909. This railway serves the town of Petropolis, a summer resort much frequented by the inhabitants of Rio. The district which it traverses is chiefly agricultural and industrial.

A branch line of 35 km. 861 connects this system with the towns of Entre Rios (Central Railway) and Piracema, which is a railhead for another line of 156 km. 684. The latter connects with the Linha do Centro. There are three branch lines: the first, of 25 km. 998 in length, terminates at the town of Mar de Hespanha; the second, of 67 km. 841, also connects this system with the Central Railway at the station of Juiz de Fora; the third, of 27 km. 469, terminates at the town of Pomba.

We must also mention the following branch lines: one of 90 km. 037 which starts from Ponte Nova on the Linha do Centro and terminates at Sao Sebastao de Matipo; another of 36 km. 100, which connects Cataguazes (Linha do Centro—kilometre 103.362) with the town of Mirahy; another, which may be termed a sub-branch, connects the Cataguazes-Mirahy Line with the town of Joao Pinheiro. Finally there is a small line of 12 km. 319

which connects the Linha do Centro with the town of Leopoldina, a very important centre of coffee planting. Finally the Maua-Sao de Rio Preto line is connected with Rio de Janeiro by a line which starts from Praia Formoza, serves the suburbs of Rio and connects with the above system at Entroncamente after covering a distance of 46 km. 138.

This completes the account of lines owned by the "Leopoldina Railway Co. Ltd.".

This large system, the second largest in Brazil, serves a zone of great economic importance and connects the capital of the country with the principal towns of the States of Rio and Espirito Santo and with one of the most productive districts of the State of Minas Geraes.

We have already referred to the town of Formiga, the terminus of one of the lines of the Western Railway of Minas Geraes. There is also another line which starts from Formiga and which will be of considerable importance when it has reached the points at which it is aiming, namely, the capital of the State of Goyaz and the Upper Araguaya, one of the large tributaries of the Amazon. There are also several branch lines extending towards the Upper Tocantins, another tributary of the Amazon, and towards the Parahyba, the principal tributary of the Upper Paraguay. This line will thus connect the basins of the Amazon and the Paraguay; but this extensive and interesting plan can only be gradually carried into execution. At present a branch line is in course of construction which will connect the southern districts of Minas Geraes and Goyaz with the lines which already exist, in order to connect them with the two large harbours of Rio de Janeiro and Santos. The line already laid is composed of two sections which will connect at Catalao (State of Goyaz). One of these sections starts from Formiga and terminates at Patrocinio (Minas Geraes) covering a distance of 356 km. 270 (gauge 1 metre); the other starts from Araquay (Minas Geraes) and terminates at Roncader (State of Goyaz), covering a distance of 211 km. 220. This line is connected with Catalao by a branch line of 28 km. 241, starting from Goyandira (km. 92.485). It should be remarked that the construction of this railway was only undertaken in 1908. It passes through an exceedingly mountainous and difficult district. In spite of such difficulties, 173 km. 261 of line was laid down between December 31st, 1913 and December 31st, 1919.

Local Lines.—Before commencing a description of the systems which serve the Northern and Southern States, we must mention certain local lines in the Federal district and in the State of Rio de Janeiro. At the capital itself there is an electric railway for the ascent of the Corcovado (altitude, about 700 metres), from which a magnificent panorama is to be seen.

The Rio do Outo Railway (59 km. 900) serves the more distant suburbs of the capital. It has five small branch lines.

The Marica Railway (State of Rio de Janeiro) starts from Nictheroy. It covers a distance of 65 km. 108, and serves certain towns and villages of the State of Rio.

The Therezopolis Railway (gauge 1 metre) connects the town of Therezopolis with Piedade, on the Bay of Rio (distance 33 km. 200).

The Rezande-Bocaina Railway starts from Suruby (State of Rio) and terminates at Sao Jose de Barreiros, covering a distance of 38 km. 810.

Finally we should mention two local lines in the State of Minas Geraes, one of 51 km. 995, connecting Sao Jose de Paraizo with the Rede-Sul Mineira line; the other, which is driven by electric power (gauge 0.66 metres), connecting the gold mines of "Merro Velho" with the Central Railway (distance 8 kilometres).

* * *

Let us now glance briefly at the different lines which serve the State of Sao Paulo. The economic importance of this State as the greatest producer of coffee is well-known. Its port of export is Santos, and it is to this port that all the coffee and the numerous other products of the State of Sao Paulo, as well as a large part of those of Parana and Southern Minas Geraes, are sent. Santos is connected with the interior of the State by "The Sao Paulo Railway Co. Ltd.)

Sao Paulo Railway Co. Ltd.—This line is 139 km. in length. It connects the port of Santos with the capital of the State and with the town of Jundiahy, where it terminates. It climbs the Sierra do Mar by four inclined planes and thus reaches an altitude of 778 metres in an ascent of 10 km. 598 (maximum gradient 0,111 metres). The crossing of the Sierra do Mar involved considerable and costly engineering. The trains there are worked by four sections of steel cable, for which the motive power is supplied by a stationary engine at each stage of the ascent. The line is double. The gauge is 1 m. 60. The maximum radius of curvature is 241 metres; the maximum gradient, with the exception of those on the line over the Sierra do Mar, is 0.025 m. There are two branch lines: one from Campo Limpo to Vargem (length 76 km. 910); the other of 30 km. 784 (Ramal de Piracaia).

Jundiahy is an extremely important junction; another line of considerable importance—the "Companhia Paulista"— starts from this point. This latter does not cross country of a difficult nature and has not necessitated any very important engineering works. It serves a very fertile and highly populated district, and is chiefly used for the conveyance of coffee. It is composed of several sections, which are as follows:

Jundiahy-Descalvado, 223 kil. 773 (gauge 1 m. 60); on this section there are three branch lines; Cordeiro to Rio Clara, 133 km. 687; Laranja Asoda to Santa Vorodiana, 40 km. 374; Porto Ferreira to Moema, 36 km. 568; Descalvado to Aurora, 13 km. 840; a line of 331 km. 600 (gauge 1 metre) starts from Rio Claro and terminates at Barretos. A branch line of 144 km. 324 connects the town of Jahu with this line (junction at Viscondo de Rio Claro, 54 km. 662).

Two branch lines start from Sao Carlos de Pinhal on the Rio Claro-Barretos line: one of 62 km. 976 (terminus Santa Eudoxia); the other of 120 km. 552 (terminus Piratininga). The town of Bauru is connected with this branch line by a line of 38 km. 178. There is also a branch line connecting the town of Pontal with the Rio Claro-Barretos line; it commences at

Rincao (159 km. 204) and follows the course of the Mogy-Guassu as far as the small town of Pontal.

This list shows the large extent of the zone served by the Paulista System.

Mogyana Railway.—Another system, the Mogyana Railway, of considerable economic importance, built, worked and administered by a Brazilian company with a Brazilian staff, starts from Campinas (which is also included in the Paulista system and serves the north of Sao Paulo and part of the south-west of Minas Geraes. It extends as far as the frontier of Goyaz and connects by branch lines with the Southern railways of Minas Geraes. The whole district traversed by this railway is extremely fertile. In the State of Sao Paulo it serves the richest coffee-planting districts. Its construction was commenced in 1873 and the total length of line is at present 1,688 km. 717. The main line connects the town of Campinas with Araguary, in the State of Minas Geraes, covering a distance of 788 km. 821. This line passes through the town of Ribeirao Preto, the principal coffee-planting centre in the State of Sao Paulo. It also serves the town of Uberaba, a centre for stock-raising, grain-growing and cotton and sugar cane plantation and an important trading station for the South of Goyaz and the State of Matto Grosso.

This line has nine branches : Juaguary–Monte–Alegre, 49 km ; Mogy–Mirim–Sapucahy, 50 km. ; Mogy–Guassu–Espirito–Santo de Prinhal, 37 km. ; Cascavel–Caldas (thermal station), 203 km. 653 ; Lagoa to Vargem–Grande, 20 km. ; Santos–Dumont to Cajuru, 60 km. ; Cravinhos to Serrana, 28 km. 662 ; Burracao to Francisco Schmidt, 34 km. ; Entroncamento to Igarapava, 157 km. A branch 41 km. in length starts from Ampara on the Jaguary–Monte–Alegre line and ends at Serra Negra. Another branch line of 32 km. starts from Monte Alegre and ends at Soccorre.

A branch line of 45 km. starts from Ribeirao de Valle on the Casa Brancha–Canoas line and ends at Guaxupe. As we have stated above, this is the junction of this railway with the Rêde Sul Mineira line.

A sub-branch of 16 km. starts from the station of "Bifucacao" on the branch line Gravinhos-Serrana.

Finally there is the Igarapava-Uberaba line (47 km. 765) which provides another connection between the principal town in the South of Minas Geraes and the Mogyana Company's system.

The Paulista and Mogyana Railways serve the centre and north-west of the State of Sao Paula. Let us now see how the south and east of this State are connected with the Sao Paula Railway, or in other words with the harbour of Santos.

Sorocabana Railway.—The capital of Sao Paulo is the railhead of another system which is also due to Brazilian enterprise : the "Sorocabana" Railway. The length of track on this system is at present 1,669 km. 815. It serves a large district comprising the whole of the south-west of Sao Paulo, rich in various products (coffee, cotton, oleaginous fruits, cereals, etc.). The main line, 438 km. 439 in length, connects Sao Paulo with Bauru (gauge 1 m. maximum gradient 0. 025 m., minimum radius of curvature 120 m.). A line of 300 km. 259 starts from Mayrink (73 km. 273) and connects the main line with the town of Sao Peidro. A branch of 43 km. 100, starting from Taicy (150 km. 883). connects this line with the town of Jundiahy, whose importance has already been alluded to.

A branch line of 21 km. 545 starts from Boituva (on the line Sao Paulo-Bauru) and connects it with the town of Tatuhy, from which another line of 250 km. 007 in length extends as far as the town of Itarare.

Another branch line (8 km. 069) connects the town of Tiete with the main line at Cerquilho (117 km. 816).

There is also a branch line of 30 km. 072 which connects the main line with Porto Martins on the River Tiete.

From Capao Bomito (316 km. 402) starts a line which connects the main line with the River Paranapanema, a tributary of the Parana. 511 km. 279 of this line, which is still in construction, is already in use. A branch line of 25 km. 380, starting from Mandury (125 km.), connects this line with the town of Piraju on the Paranapanema.

The Mayrink–Sao Peidro line has a branch line of 24 km. 662 which connects it with Fort Joao Alfredo on the Piracicaba.

We have mentioned the different sections of the Socrocabana Railway. The reader will have observed the vast extent of the zone served by this railway. It should be added that the main line joins that of the north-western railway, and that by its branch line of Itarare this great system connects with the Sao Paulo-Rio Grande Railway, with which we shall deal later. It connects the basins of the Paranapanema, the Tiete and the Piracicaba, and by its junction with the Sao Paulo Railway Company, places all these districts in communication with the harbour of Santos.

Secondary Systems.—Let us now examine certain secondary systems which are operated by companies other than those to which we have referred. The Dourado Railway, of which Ribeirao Bonito is the starting point, has two sections: Ribeirao Bonito to Barity (83 km. 248), with a branch (26 km. 120) from Tobatinga to Irapolis (gauge 1 metre); and Ribeirao Bonito to Ibitinga (124 km.). The gauge of the latter is 0.60 metres, the maximum gradient 0.030, and the minimum radius of curvature 60 metres.

The Northern Sao Paulo Railway (gauge 1 metre, maximum gradient 0.020 m., minimum radius of curvature 120 metres) connects the town of Araquara with Sao Jose de Rio Preto, covering a distance of 228 km. 136; a branch (51 km.) connects it with the town of Tabatinga. It is in this way connected with the Dourado Railway system, and the system of the Paulista Company (at Araquera).

The Sao–Paulo–Minas Railway starts from Bento Quirino and terminates at Sao Sebastio de Paraizo, where it connects with the Rêde Sul Mineira Railway, which we have already mentioned.

The Sao Paulo–Goyaz Railway (gauge 1 metre) and two branch lines: Pansagem to Monte Azul (73 km. 313); Ibitiuva to Terra Nova (32 km.). The Ramal Ferreo Campineiro Railway connects the town of Cabras with Campinas (length of rail 41 km. 444, gauge 0 m. 60).

The Santos-Santo Antonio de Jucquia Railway, which connects these two towns, (length of line 159 km. 482, gauge 1 metre).

The Cantareira Tramway (gauge 0.60 m.), which serves the suburbs of Sao Paulo (length of main line 25 km., branch line 18 km.).

The electric tramway of Santo Amoro (gauge 1 m. 44, length of track 13 km. 160).

The Monte Alto Railway (gauge 1 metre, length of track 18 km.).

The Jaboticabal-Ibitiuva Railway (length of track 26 km., gauge 1 m.).

The Agricole Fazenda Dumont Railway, which connects the Fazenda Dumont with the town of Reibeirao Preto (length of track 24 km., gauge 0.60 m.).

The Perus–Pirapora Railway (length of track 16 km., gauge 0.60 metres).

The Campos–Jordao Railway, which connects Jaguaribe with Pindamonhangaba (length of track 45 km. 820).

The Itatibense Railway which connects the town of Loureiro with Itatiba (length of track 20 km., gauge 1 metre).

The Lorena-Piquete Railway (length of track 20 km.).

Finally the Punilense Railway (gauge 1 metre), starting from Campinas and terminating at Padua Salles (length of track 94 km. 263).

The above list shows the admirable system which serves the State of Sao Paulo. Its territory (290,876 sq. km.) is covered by a net-work of intersecting lines, connecting with one another, and forming a fairly complete system of communication between the sea-coast and the interior of the country.

The total length of track is 6,615 km. 454, that is to say, this system represents 23.5 % of the total length of track in operation on Brazilian territory.

Railway of North-West Brazil.—We have already stated that the town of Bauru is the junction of the Sorocabana Railway with the railway of North-West Brazil (gauge 1 metre). This railway, which, although constructed quite recently, is already 1,273 km. 480 in length, starts from Bauru. After passing through the rich western districts of the state of Sao Paulo, it enters the State of Matto Grosso, which it directly connects with the Paulista system, and, through the latter, with the main coast centres.

The section in operation connects Bauru with Porto Esperança, on the left bank of the Paraguay, at a distance of 90 kilometres from Corumba, which is also on the left bank of the Paraguay, and is connected with Porto Esperança by a steamship line. Corumba is, after the capital, the most important town in the State of Matto Grosso. It is the principal port and trading centre. It should be added that this railway passes through Itapura, the centre of an extensive system of waterways formed by the Parano and its tributaries. It seems unnecessary to make any further comment on the economic and strategic importance of this railway, which connects several of the richest districts of our vast country.

Sao Paulo-Rio Grande Railway.—As we have already indicated, the town of Itarare is the railhead of a most important system which connects four states of the Federation — the Sao Paulo-Rio Grande Railway. This line crosses the state of Parana, the state of Santa Catharina, and terminates in the state of Rio Grande do Sul, after covering a distance of 883 km. 206 (guage 1 metre, minimum radius of curvature 101 metres, maximum gradient 0 m. 025). At Ponta Grossa, in the state of Parana — that is to say, after covering a distance ot 251 km. 901, this main line joins the Parana Railway. The state of Sao Paulo is thus placed in direct communication with the capital of Parana, Curityba. This line, connecting Ponta Grossa with Curityba, is 190 km. 989 in length. It is simply an extension of the line which connects the capital of the State with the harbour oi Paranagua. Ponta Grossa is a most important junction. This town (altitude 941 metres) is situated in an extremely fertile regicn suitable for all kinds of cultivation and including vast pasture lands for stock raising. It is the trading centre for the whole ot the west and south districts of the State ot Parana.

Parana Railway.—We have stated that Curityba is connected with the sea by the Parana Railway. This line is 110 km. 360 in length. It crosses the Sierra do Mar, thanks to remarkable engineering works (maximum gradient 0.03, minimum radius of curvature 90 metres, guage 1 metre). The audacity and originality of its construction have made it one of the most celebrated railways in South America. Among the feats of engineering which it presents, we may mention its numerous tunnels, a large viaduct constructed along the side of a mountain and following its irregularities, and a bridge on iron pillars 50 metres in height connecting two mountains over an abyss of rocks and bushes.

This line is connected with the town of Antonina by a branch line of 16 km. 995, starting from the station of Morretes.

Two other branch lines may be mentioned : one of 88 km. 915, which connects the Ponta Grossa-Curityba line with the town of Rio Negro on the river of that name ; the other of 9 kilometres, terminating at Porto Amazonas, which is situated on the river Iguassu.

Another line starting trom the capital of Parana connects it with the town of Rio Branco, a distance of 47 km. 397 (gauge 1 metre).

Let us now return to the Sao Paulo-Rio Grande Railway. This has two branch lines in the state of Parana ; one connects the main line with the town of Sao José (junction at Jaraguanyva), covering a distance of 52 km. 960 ; the other, of 44 km. 980, terminates at Nova Restinga.

The main line leaves the state of Parana at Uniao da Victoria, a small town situated on the left bank of the Iguassu river, which is crossed by a viaduct of nearly 500 metres in length. The line crosses the state of Santa Catharina, a distance of 351 km. 303, and ends, as we have already stated, in the state of Rio Grande do Sul on the banks of the Uruguay River.

The state of Santa Catharina has no very extensive railway system. In addition to the 351 kilometres of the Sao Paulo-Rio Grande Railway to which we have referred, there is a line of 326 km. 288 in length belonging to the same company, but not as yet connected with the main line, a railway known as " Thereza Christina " (118 km. 096), and the Santa

Catharina Railway, which is still under construction, but of which 69 km 700 is in operation.

The Sao Paulo-Rio Grande section connects the harbour of San Francisco (the most important in the state) with several centres of production and terminates at Canoinhas; the Thereza Christina Railway (guage 1 metre, maximum gradient 0.020, minimum radius of curvature 100) also starts from the sea-coast, and terminates at Lauro Muller. A short branch (5 km. 340) connects the latter railways with the harbour of Laguna. The Santa Catharina line (gauge 1 metre) starts from Blumenau and extends as far as the town of Hansas, where it connects with the San Francisco-Canoinhas line. We have already said that the Sao Paulo-Rio Grande line connects with the Rio Grande do Sul Railway on the banks of the river Uruguay. Let us now examine the railway system of this state situated in the southernmost part of Brazil.

Rio Grande do Sul Railway.—The capital of the State, Porto Alegre, a town of about 120,000 inhabitants, situated on the left bank of the Guahyba river, is the railhead of a system the main line of which reaches the town of Uruguayana on the frontier of the Argentine Republic, a distance of 762 km. 660 (gauge 1 metre, maximum gradient 0 m. 018, minimum radius of curvature 124 metres.) A branch line of 2 km. 108 connects it with the River Taquary. Another branch line of 53 km. 115 connects it with the town of Taquara. Another line of 115 km. 800 connects it with the town of Caxias. A little further on there is another branch (31 km. 099) which connects it with the town of Santa Cruz. A line of 534 km. 533 connects it with the Sao Paulo-Rio Grande Railway. This latter starts from Santa Maria and passes through the towns of Cruz Alta and Passo Fundo. A branch line, 78 km. 500 of which is already in use, is in construction. It starts from Cruz Alta and will terminate at Santo Angelo. A line of 489 km. 377, starting from Cacequi (on the line Porto Alegre Uruguayana) connects it with the harbour of Rio Grande, after passing through the town of Sao Gabriel, Bagé and Pelotas. A branch line of 16 km. 566 connects this line with the Atlantic coast, and terminates at Sequeira. The Porto Alegre Uruguayana line also has a branch line connecting it with the town of Sant-Anna do Livramento, and extends as far as the frontier of the Republic of Uruguay, covering a distance of 156 km. 307. It thus connects the Brazilian railways with those of Uruguay.

The town of Uruguayana, on the Uruguay, which is the terminus of the main line crossing the State from East to West, is also the railhead for two lines, one of 75 km. 264, terminating at Guarahim on the frontier of Uruguay · the other of 299 km. 304, ter minating at Sao Borja.

We should also mention a line (80 km. 911) connecting the town of Sao Pedro with the banks of the river Jaguary, and finally, the small system which serves the neighbourhood of Pelotas.

Such is the magnificent system which serves the great southern State of Brazil. A glance at the map will show the reader the excellent distribution of the railways of this state. It should be added that they are as important strategically as economically.

The reader will doubtless have remarked the connections existing between all the large systems which we have described. There is, in fact, a whole system of railways connecting the basins of the Sao Francisco, the Iguassu, the Uruguay and the Paraguay. In the same way the principal coast centres, from Victoria, in the State of Espirito Santo, to Rio Grande, are all connected with each other, and enjoy an ingenious system of communications with the most important inland towns of seven great States.

Let us now examine the systems which serve the northern part of the country.

Railways of Espirito Santo.—We have shown above how the Leopoldina Railway connects Victoria, the capital of Espirito Santo, with Rio de Janeiro. Victoria is the railhead of a line which will terminate at Diamantina, in the State of Minas Geraes. This line starts not from Victoria itself but from a small place opposite Victoria, known as Porto Velho. Its total extent is 390 km. 678 206 km. 460 in the territory of Espirito Santo, and the remainder in Minas Geraes (gauge 1 metre, minimum radius of curvature 100 metres, maximum gradient 0 m. 025). A section of this line, 147 km. 516 in length, connects Diamantina with the Central Railway of Brazil (at Curralinho). When the main line has reached its terminus, namely Diamantina, this railway will provide the north and centre of Minas Geraes with a new outlet to the Atlantic. It will serve an extremely rich mining district.

No railway connection exists between the State of Espirito Santo and that of Bahia, its northern neighbour. There is, therefore. a serious gap in the Brazilian railway system at this point.

Bahia Railways.—The state of Bahia (426,427 sq. K.) possesses a fairly complete railway system ; there are 1,728 K. 103 of line in use. The longest on this system is that which connects the capital with the town of Joazeiro on the Sao Francisco river, a distance of 575 K. 440 (gauge 1 metre, maximum gradient 0 m. 0125 ; minimum radius of curvature 300 m.). It should be mentioned that Joazeiro is an important junction : it is the port of departure for boats navigating the Sao Francisco River as far as Pirapora (Minas Geraes, terminus of the central railway), a distance of 1,367 K. The main line to which we have referred has a branch (544 K. in length (gauge 1 m., maximum gradient 0 m. 0166, minimum radius of curvature 120 m.) which passes through Aracaju, the capital of Sergipe, and terminates at Propria in the same state. A sub-branch of 11 k. 890 connects this branch with the town of Capella (Sergipe). We must also mention a branch line which is under construction and which will connect the town of Bomfim (on the Bahia-Joazeiro line) with Sitio Novo. Including a sub-branch of 9 K. 905, which connects it with the town of Campo Formozo, 106 K. 800 of this branch is already in operation.

Sao Felix, which is of a certain commercial importance, is the railhead of another system (Central Railway of Bahia) which will also end at the river Sao Francisco. It already has 254 K. 600 of track in operation, and its present terminus is at Bandeira de Mello. It is connected with the town of Feira de Santa Anna by a branch line (47 K. 943 in length, gauge 1 metre, maximum gradient 0 m. 033, minimum radius of curvature 120 m.). It will be connected by another branch line, not yet built, with the town of Theophile Ottoni in the north of the State of Minas Geraes. A very small section of this branch line (13 K. 400) is constructed and in use.

Another line, which is entirely unconnected with the two to which we have referred, connects the small harbour of Nazareth with the town of Toca da Onça, covering a distance of 194 K. 929 (gauge 1 m. maximum gradient 0 m. 025 ; minimum radius of curvature 120 m.). A branch line of 26 k. 755 connects it with the town of Armahoza. This line will be extended as far as the town of Itabuna, where it will connect with the Ilheus-Conquista Railway. An extremely fertile district of the state of Bahia will thus be placed in communication with the harbours of Nazareth and Ilheus. A line of 82 K. 750 (gauge 1 metre) starts from the latter harbour.

The town of Santa Amaro is the railhead of a line of 88 K. 350 which connects it with the town of Bom Jardim, and with the main line Bahia-Joazeiro.

Another line connects the north of Minas Geraes with the port of Caravellas in the state of Bahia. This is the Bahia-Minas Railway, which starts from Caravellas and ends at Theophile Ottoni (Minas Geraes), a distance of 376 K. 270 (gauge 1 m., maximum gradient 0 m. 025, minimum radius of curvature 109 metres.).

Finally there is "The Centro-Oste Railway" (length 51 K. 863, gauge 1 metre).

Bahia also possesses the following local lines :—

Usina S. Bento	gauge 1 m.	14 km.	Connect with the S. Amaro line.
» Terra Nova	» 1 »	12 »	
» Alliança	» 1 »	14 »	
» Capimirim	» 1 »	1 »	
» Malemba	» 1 »	6 »	
» S. Carlos	» 1 »	8 »	
» Colonia	» 0 » 65	13 »	
» S. Joao	» 0 » 75	4 »	
» Pitanga	» 1 »	6 »	Connects with the Bahia-Sao Francisco line.
		78 km.	

The above description serves to show that the state of Bahia already has a group of lines which will form a system of great economic importance when they are connected up.

Alagoas Railways.—We have seen how the State of Bahia is connected with that of Sergipe. There is no railway connection between Sergipe and its northern neighbour the State of Alagoas. The latter possesses a system 326 km. 801 in length. A line operated by " The Great Western Railway Co. Ltd. of Brazil " starts from Jaragua, a small harbour near Maceio, the capital of the State, and connects Alagoas with the State of Pernambuco (gauge 1 m., maximum gradient 0 m. 020, minimum radius of curvature 100 metres). The main line covers a distance of 119 kilom. 358 in the territory of Alagoas and has a branch line of 106 kilom. 069 which connects it with the town of Vicosa. A line entirely unconnected with the above runs along the left bank of the Sao Francisco river and transports goods in river transit past the cataracts of Paule Alfonso (gauge 1 m., maximum gradient 0 m. 030 ; minimum radius of curvature 82 m.). The length of this line is 115 kilom. 136-101 kilom. 374 in the State of Alagoas and 13 kilom. 752 in Pernambuco. Its railhead and terminus are the town of Piranhas (Alagoas) and Jatoba (Pernambuco) respectively.

The system, whose main line starts from Jaragua, also serves three other states : Pernambuco, Parahyba and Rio Grande do Norte. It thus provides an extremely important means of communication between four units of the Federation and serves one of the most productive districts of north-east Brazil.

Pernambuco Railways.—As we have stated above, the state of Alagoas is connected with the neighbouring state of Pernambuco by the main line of " The Great Western Railway of Brazil ". This line covers a distance of 119 kilom. 358 before reaching the territory of Pernambuco. From Glycerio, that is to say at a distance of 16 kilom. 130 from the frontier, a branch line of 56 kilom. 301 runs to Garanhuns. This is eventually to be extended as far as the town of Bom Conselho, on the river Papacara. The main line reaches Recife after covering a distance of 230 kilom. 862. Two branch lines commence at a distance of 86 kilom. 870 from Recife : one, 28 kilom. 663 in length, runs to Cortez ; the other, 55 kilom. 282, to Barreiros. Recife, which is a harbour of great economic importance, is the railhead of two other particularly important main lines. One of these extends into the interior of the State (former Central Railway of Pernambuco) for a distance of 269 kilom. 268 (present terminus Rio France) but its construction is not yet entirely completed. Its total length will be 455 kilom. 888 and it will end at Flores. It serves one of the richest districts in Pernambuco (cotton, sugar-cane plantations, etc.). The second connects Recife with the state of Parahyba de Norte (area 74,731 sq. kilom.). Its length of track in the state of Pernambuco is 129 kilom. 101. There is a branch line of 23 kilom. which connects it with the town of Limoeire.

Railways of Parahyba de Norte.—The frontier of the State of Parahyba de Norte is crossed at the station Rosa e Silva. A branch line of 81 kilom. 269, commencing at a distance of 14 kilom. 700 from the frontier, connects the main line with the town of Campina Grande. At a distance of 51 kilom. 795 from the frontier the line bifurcates. The main line continues northwards, while a branch of 50 kilom. 198 connects it with the towns of Parahyba, the capital of the State, and Cabedello an Atlantic port. A branch line of 23 kilom. 155 connects the town of Alagoa Grande with the main line (junction at Mulungu at kilom. 225,204). Finally, a branch (in the state of Parahyba) connects this line with Borborema, a distance of 24 kilom. 343

and, after covering a distance of 122 km. 200, terminates at the town of Natal, the principal harbour and capital of the state of Rio Grande de Norte (area 57,485 sq. km.). Natal is also railhead of the Central Railway of Rio Grande, which serves the interior of the State, covering a distance of 147 km. 358 (gauge 1 m.), and terminates at Lages.

Finally there is the Mossoro Railway, which connects Mossoro with Porto France, a distance of 37 km. 960 (gauge 1 metre).

The above figures show the extent of the system operated by the Western Brazil Railway Co. (1,475 km. 962). This system serves four North Brazilian States, one of which—Pernambuco—is destined to become one of the most important railway centres in the country.

Ceara Railways.—The State of Ceara (area 104,250 sq. km.), which borders on Rio Grande de Norte, is not yet connected with the latter by rail. Ceara has, however, a railway system of 891 km. 256. The town of Fortaleza (about 80,000 inhabitants), the capital and principal harbour of the state, is the railhead of the most important section : the Baturité Railway (guage 1 metre, maximum gradient 0 m. 020, minimum radius of curvature 130 metres). This railway connects the capital with several towns in the interior. It terminates in the district of Iguatu, after covering a distance of 413 km. 482, and has a branch line of 7 km. 246 which connects it with the town of Laranguape. Another branch line is in course of construction ; 19 km. 6 have already been completed. It will end at the town of Itapipoca, which is 154 km. from Fortaleza.

The other section is formed by the Sobral Railway (guage 1 metre, maximum gradient 0 m. 018, minimum radius of curvature 181 metres), which connects the harbour of Camocim (north of the State) with the town of Cratheus, and covers a distance of 373 km. 493. This line is being extended towards Therezina, the capital of the State of Piauhy. These two lines are at present unconnected with each other, but there are already plans for a line to connect them. The construction of two other sections which will connect these systems with the States of Pernambuco and Parahyba de Norte is also under consideration.

Piauhy.—The State of Piauhy (301,797 sq. km.) has at present no railways at all. Several plans have already been approved. We have stated that the Sobral will extend to Therezina, and it may be added that plans have recently been approved for a railway from Petrolina (in the state of Pernambuco, opposite Joazeiro on the river Sao Francisco) to Therezina, which will connect the capital of the state of Piauhy with the Bahia railway system, a distance of 436 kilometres.

Maranhao Railways.—The State of Maranhao (area 459,884 sq. km.) has a railway system covering 178 kilometres. There are two lines, one of which is still in construction, although 106 kilom. is already in use ; this will connect the capital Sao Luiz with Caxias. It will join on to the line from Caxias to Flores (formerly Cajazeiros) situated on the left bank of the Parahyba river, opposite Therezina, the capital of Piauhy (guage

1 metre, maximum gradient 0 m. 030, minimum radius of curvature 150 metres).

Para Railways.—The State of Para (area 1,149,712 sq. km.) is not connected with the State of Maranhao by rail. It is, however, served by two systems : one of 315 km. 752 — the Bragança Railway ; the other of 82 km. — the Tocantins Railway. The Bragança line connects the town of Belem, the capital of the State[1], with the harbour of Bragança, and passes through a very fertile region. It is destined eventually to connect the State of Para with Maranhao (guage 1 metre, maximum gradient 0 m. 020, minimum radius of curvature 250 metres). This line possesses four branch lines, namely : that which connects it with Pinheiro (27 km. 544) ; the Benjamin Constant branch (17 km.) ; the Bemfica branch (9 km.) ; Igarapé-Assu to Prata branch (21 km.).

The Tocantins line (guage 1 metre) which is still under construction, is to connect the navigable sections of the river Tocantins and the river Araguaya[2]; 82 km. of line are already in operation.

Amazonas Railways.—Amazonas, the northernmost state of Brazil, possesses one line : the Madeira-Mamoré Railway (guage 1 metre, maximum gradient 0 m. 010, minimum radius of curvature 190 metres), which starts from Porto Velho on the right bank of the river Madeira, in the State of Amazonas, and reaches the Mamoré river at Guajara-Mirim, in the State of Matto Grosso, a distance of 363 km. 400.

This railway establishes direct communication between the north of Matto Grosso, Bolivia and the basin of the Amazon. It connects the navigable portions of the Mamoré with the lower Madeira.

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Such, in their essential outlines, are the various railway systems of Brazil. We have confined ourselves to a very brief summary. It is, however, easy to understand the work involved in the construction of nearly 30,000 kilometres of railway in a country where rails must be imported, where rolling-stock is for the most part bought from foreign countries, where labour is short and consequently at a premium, where natural obstacles of all kinds exist, and where the centres of population are, in general, at considerable distances from one another, as may be seen from a comparison of our territory and our population, the former being almost as large as Europe, and the latter numbering scarcely 30 millions.

The brief summary given shows that the principal lines of Minas Geraes, Rio de Janeiro, Sao Paulo, Parana, and Rio Grande do Sul are all connected, thus forming, with the lines of Espirito Santo and those of Matto Grosso, a fairly complete railway system. This system connects nine units of the Brazilian Federation. A second important system serves two states : Bahia and Sergipe, and is itself connected with the large system just mentioned by the river Sao Francisco. A third system, remarkable for its length of track and economic importance, connects the states of Alagoas, Pernambuco, Parabyha and Rio Grande do Norte. Two lines which are not as yet, but which soon will be connected, form the most important railways of the State of Ceara. Another line which is also isolated, and as yet incomplete, serves part of the State of Maranhao. In the extreme north of the country there are three lines entirely unconnected with each other. For the most part these lines connect distant zones which are partly served by navigable waterways. The basins of some of our principal rivers are thus connected with one another. We have alluded to the constructions which are projected, and it is easy to form an idea of the magnificent system of communications which Brazil will possess when our railways and navigable waterways are all connected up.

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[1] See description of this harbour (Para).
[2] See chapter on fluvial navigation.

It cannot be denied that technical conditions differ on the various Brazilian railways. In particular the difference of guages will have been noticed. We may state, however, that the differences are being eradicated. The guage is the same (1 metre) on 89.89 % of our railways. The guage of 1 m. 60 is adopted on 5.74 % of our railways. Other guages — that is to say, 1 m. 44, 1 m. 33, 0 m. 76, 0 m. 66, or 0 m. 60--only exist on 4.30% of the lines in use.

The following tables will serve to complete the above information.

I. *Railways of the United States of Brazil.*

Length of Lines in Operation.

			Kilometres.
1.	Federal.	Madeira Mamoré	364,260
2.	»	Tocantins	82,000
3.	»	Bragança	315,752
4.	»	S. Luis to Caxias	100,000
5.	»	Caxias to Cajazeiras	78,000
6.	Rêde de Viaçao Cearenso		891,256
7.	Federal.	Central de Rio Grande de Norte	147,358
8.	»	Mossoro	37,690
9.	Great Western Railway of Brazil		1,617,017
10.	Federal.	Recife to Deboribo	9,335
11.	Rêde de Viaçao Bahiana		1,933,572
12.	Federal.	Nazareth e ramal de Amargoza	221,684
13.	»	Santo Amaro	88,350
14.	»	Ilheos to Conquista	82,750
15.	»	Victoria to Minas	590,678
16.	»	de Corcovado	3,824

			Kilometres.
17.	Federal.	Therezopolis	33,820
18.	»	Marica	130,400
19.	Leopoldina Railway		2,945,825
20.	Federal.	Rezende to Bocaina	38,810
21.	»	Central of Brazil	2,438,518
22.	»	Rio de Ouro	127,676
23.	»	Oeste de Minas	1,564,087
24.	Rêde Sul Minera		1,373,689
25.	Federal.	Lorena to Itajuba	20,000
26.	»	Morro Velho	8,000
27.	»	Goyaz	590,731
28.	»	Mogyana	1,688,717
29.	Sao Paulo Railway		247,312
30.	Federal.	Paulista	1,245,055
31.	»	Sorocabana	1,669,815
32.	»	Bauru to Porto Esperança	1,273,480
33.	»	Dourado	273,368
34.	»	Sao Paulo to Goyaz	145,163
35.	»	Funilanse (Ad. Estadual)	94,263
36.	»	Sao Paulo to Minas	136,600
37.	»	Itatibense	20,097
38.	»	Norte de Sao Paulo (Araraquara)	279,136
39.	»	Santos to Juquia	159,482
40.	Ramal Ferreo Campinero		41,444
41.	Tramway of Cantareina (State Administration)		43,000
42.	Tramway of Santo Amare		13,160
43.	Federal.	Campos de Jordao	45,820
44.	»	Monte Alto	18,000
45.	»	Jaboticabal	26,000
46.	»	Perus to Pirapora	16,000
47.	»	Con Agricola Fazenda Dumont	24,000
48.	»	Sao Paulo-Rio Grande	1,896,642
49.	»	Norte de Parana	43,397
50.	»	Thereza Christina	118,096
51.	»	Santa Catharina	69,700
52.	Rêde Viaçao Ferreau de Rio Grande do Sul		2,252,996
53.	Brazil Great Southern Railway		299,467
54.	Federal.	Cruz Alta to Porta de Lucona	78,500
55.	»	Porto Alegre to Tristeza	11,980
56.	»	Carles Barbeza to Bento Gonçalves	22,000
57.	»	Taquara ao Canella	40,000
			28,127,712

II. *Railways of the United States of Brazil.*

Length of Lines in use in each State.

State.	Kilometres
Amazonas	8,281
Para	397,752
Maranhao	178,000
Ceara	891,256
Rio Grande de Norte	323,329
Parahyba de Norte	328,822
Pernambuco	832,448
Alagoas	326,801
Sergipe	298,923
Bahia	1,728,103
Espirito Santo	609,376
Districto Federal	258,329
Rio de Janeiro	2,535,839
Sao Paulo	6,613,454
Parana	1,110,267
Santa Catharina	1,017,568
Rio Grande do Sul	2,704,943
Mato Grosso	1,167,035
Goyaz	181,770
	28,127,712

III. *Railways of the United States of Brazil.*

Length of lines of each gauge in use.

Gauge	Kilometres
1.60	1,615,661
1.44	13,160
1.33	9,335
1.00	25,104,821
0.76	723,417
0.66	8,000
0.60	574,976
Mixed	78,342
	28,127,712

II.

WATERWAY AND MARITIME NAVIGATION.

In Brazil, every kind of navigation is in practice. There is no branch of the science which will not have to be considered in a study of Brazilian navigation.

Considered geographically, Brazil's navigation must be divided into three classes: inland navigation, coastal navigation, and ocean-going navigation.

From a commercial point of view, the divisions are *(a)* coasting-trade, and *(b)* international navigation. "Coasting-trade" here includes also navigation on rivers, lakes and lagoons. The following table shows the various classes of navigation by which Brazil is served.

The coasting traffic carries national or nationalised products between the Brazilian ports. It is therefore an industry entirely given over to Brazil's home trade. Under Article 13 of the Brazilian Constitution it has been reserved entirely for the Brazilian flag, but vessels flying this flag are subject to the same customs regime as ships of other nationalities when they carry goods subject to import duties from foreign countries to Brazilian ports or take on board in the national ports goods in transit or intended to be re-exported.

We have both long-distance and a local coasting trade. The long-distance coasting trade is that carried on between at least two States of the Union. By "local coasting trade" is meant that carried on between ports of the same State on the coast or on inland waterways, and also, by an extension, that carried on by vessels of shallow draught between ports of two neighbouring States, when these ports are situated near the common frontier. It can be seen, therefore, that the capacity of the boats is not sufficient to characterise the nature of the coasting trade, for vessels with the same tonnage are employed both in the local and in the long-distance trade. Naturally, however, the shallow-draught boats are more suitable for the requirements of the local trade and are more often employed in it.

It is clear from the above that in considering Brazilian shipping it must be divided into three parts: inland navigation, coastal navigation and ocean-going navigation. This latter is much less developed than the first two. In order to have some idea of the two former, a number of complicated factors must be borne in mind; to understand the latter it is sufficient to enumerate the services maintained by ships employed on ocean voyages.

For a full account of Brazil's inland navigation and coasting traffic, it would be necessary to give an amount of technical and geographical information which would exceed the limits permitted to us in this report. It would be necessary, in fact, to describe not only the innumerable variety

Navigation in Brazil.

- Considered geographically
  - Home navigation
    - Inland
      - Rivers, lakes and lagoons
    - Coastwise
  - Navigation between Brazil and other countries
    - Ocean-going
      - Trans-oceanic
      - Along the American coasts
    - River
- Considered commercially
  - Coasting trade
    - Long-distance coasting-trade
      - Maritime
      - River
      - Sea and river
    - Local coasting-trade
      - Maritime
      - River
      - Sea and river
  - International navigation
    - Ocean-going
      - National
      - Foreign
    - River

of vessels used on the rivers and lakes and along the coast of this immense country, but also the special conditions pertaining to each part of it, as well as to state the legislative provisions and administrative regulations referring to this vast subject. This would be impossible. We could not supply you with the mass of indispensable in formation, *e. g.*, on the law governing the coastal waters, rivers and lakes of Brazil ; the situation of all the sea and river ports and the numerous good anchoring grounds on the coast ; the influence of the tides on the coasting trade and the regular flooding of the rivers on river navigation ; the relation between the capacity of navigable waterways and the tonnage of vessels ; the innumerable peculiarities, in short, which characterise the coastal or inland navigation in each of the States of Brazil. Our sole task now is to furnish a summary as precise as possible, but inevitably incomplete.

A.—INLAND NAVIGATION.

Brazil's inland navigation presents two principal aspects, of which one is the complement of the other — navigation on rivers and navigation on lakes and lagoons. The large vessels used in the one are usually those employed in the other. River transport is carried on by various means, from the primitive raft constructed from the transported wood itself, to the large comfortable vessels maintaining regular services between the interior ports or between these ports and those on the coasts.

In the case of certain rivers, for which the Amazon will serve as an example—inland navigation is often merely the continuation of an ocean voyage, for these rivers are accessible to ships of deep draught. In addition to steamers and tugs there is an immense variety of sailing ships navigating the inland waterways of Brazil, as well as along the coasts.

From the various methods which might be adopted when describing river navigation, we shall adopt that of describing it State by State ; this will give the best idea of the coasting trade, which is the principal purpose of this type of navigation.

The State of Amazon.—The port of Manaos, the capital of this State, is one of the most important in Brazil. It is situated on the left bank of the Rio Negro, one of the northern tributaries, eight miles from the junction of that river with the Amazon. After the port of Belom du Para, it is the principal centre of the immense river system of the Amazon Basin, of which more than 40,000 kilometres is navigable.

The port of Manaos also has regular services connecting it directly with all the sea-ports of Brazil. The principal company navigating the river system of which Manaos is the centre, is the Amazon Steam Navigation Company. We shall give a list of the lines maintained by this company when we deal with the state of Para. Other enterprises, together with several commercial firms, possess a numerous fleet of steamers, tugs, launches, barges; and there are in addition several less important steamships belonging to their own captains, navigated by the owners from river to river without a fixed itinerary, carrying on commerce as occasion offers.

Among the regular services besides those maintained by the Amazon Company, we may mention the following :—

The service kept up by the boats *Marsos* and *Jane* and the tug *Gallegos*, belonging to J. H. Anderson, which make two voyages a month to all the ports of the river Solimôes as far as Remate de Males ;

The service kept up by the boats *Tapana, Canutana, Baixo Purus* and *Sylverio Nery*, which navigate the River Yaco and are the property of Armindo Teixeira ;

The service on the rivers Purus, Acre and Colonia, of which the boats belong to Th. de Mendonça & Company ;

Services on several tributaries of the Amazon maintained with boats belonging to the firms of S. J. Diniz, Araujo Rosa & Co., J. A. Soares & Co.

The State of Para :—The Port of Belem du Para is situated on the bay of Marajo which is formed by the estuary of the rivers Maju, Araca and Guama, tributaries of the southern branch of the Amazon. Belem is the principal depot for home and foreign trade in the valley of the Amazon between the Brazilian States of Para, Maranhâo, Goyaz and Matto-Grosso and the Republics of Bolivia, Peru, Ecuador and Venezuela. Imported and exported products passing through this depot are distributed by a large river fleet whose vessels pass up the Amazon to beyond the frontier between Brazil and Peru and navigate all its tributaries — the Tocantins, Xingu, Tapajoz, Madeira, Rio Negro, Coary, Jurua, Javary and many others.

The Amazon Steam Navigation Company, Ltd,, one of the oldest navigation companies, carries regular services between the following places :—

1st line. From Belem to Manaos, touching at Breves, Gurupa, Porto de Moz, Prainha, Monte Alegre, Santarem, Alemquer, Obidos, Parintins, Urieurituba and Itacoatiara.

2nd line. The Tapajoz, from Belem to Itaituba, touching at Antonio Lemos, Gurupa, Prainha, Monte Alegre, Santarem, Buim, Aveiras, Urieurituba and Brazilia Legal.

3rd. line. From Belem to Maues, touching at Boa Vista, Curralinho, Antonio Lemos, Gurupa, Almeirim, Prainha, Monte Alegre, Santarem, Alemquer, Obidos, Villa Juruty, Faro, Parintins and Barreirinha.

4th. line. The Solimoes and Javary, from Belem to Remate des Males, on the river Javary, touching at Manaes, Manacapuru, Codajaz, Coary, Teffe, Caissara, Fonte Boa, Tocantins, S. Paulo de Olivença e Tabatinga.

5th. line. The Madeira, with terminus at Santo Antonio de Rio Madeira and touching at Urucara, Silves, Itacoatiara, Borba, Vista Alegre, Bocca de Rio, Aripuana, Santa Rosa, Manicoré, Bom Future, Bocca de Carapanatuba, Bocca das Tres Casas, Cintra, Humayata, Missao de S. Francisco, Boa Hora and Bocca de Janary.

6th. line. The Purus-Acre, with terminus at Xapury, on the river Acre, and Senna Madureira, on the Purus, touching at Manaos, Manacapuru, Bocca de Purus, Barury, Guajaratuba, Piranhas, Arima, Tanuaria, Jaburu, Bocca de Tapaua, Caretia, Canatuma, Bella Bista, Axioma, Assahytuba, Labrea, Providencia, Sepatiny, Hyutanahan and Cachoeira.

7th. line. The l'Oyapeck, as far as l'Oyapeck, touching at Chaves, Bailique, Amapa, Calcoene and Counani.

8th. line. The Pirabas, terminus at Pirabas, touching at Collares, Porto Salvo, Vigia, S. Caetano, Curuça, Marapanin, Maracanan and Salinas.

All these lines start at Belem. The lines starting from Manaos are the following :—

1st. line. Autazes line, terminus at Castelle, on the river Autaz-Assu ; touching at Bocca dos Autazes, Bom Future, S. Joaquim, Coapiranga, Japeina, Pantaleao, Piratininga, S. José, et Campo Alegre.

2nd. line. Rio Negro Line, ending at Santa Isabel and touching at Purapessasu, Ayrao, Moura, Carvoeire, Barcellos, Moreira and Thomar.

3rd. line. Madeira Line, ending at Santo Antonio on the Madeira, and touching at Borba, Vista Alegre, Bocca de Aripuana, Santa Rosa, Manicoré, Bom Future, Bocca de Carapanatuba, Bocca das Tres Casas, Cintra, Humayta, Missao de S. Francisco, Boa Hora and Janary.

4th. line. Japura line, ending at Jatuarana, touching at Codajaz, Teffé, Coary, Bocca de Japura, Juraba, Jaraquy, Bom Future, Floresta, Recreio, Mameloca, Igualdade, Maguary and Villa Bittencourt.

5th. line. Purus-Acre line, as far as Xapury, on the River Acre, and Senna Madureira, on the River Purus, calling at Manacapuru, Bocca de Purus, Berury, Guajaratuba, Piranha, Itauba, Ariman, Tamaria, Jaburu, Bocca de Yapaua, Caratia, Canutama, Bella Vista, Axioma, Assahytuba, Labroa, Providencia, Sepatiny, Hyutanaham and Cachoeira.

6th. line. Jurua line, as far as Cruzeire do Sul, on the River Jurua, touching at Teffé, Bocca de Jurua, Marary and S. Felippe.

With the collapse of the rubber market there was a corresponding drop in freight rates on the Amazon and its tributaries, followed by a certain decrease in traffic.

State of Maranhao.—The port of Sao Luis de Maranhao is situated on the N.-N.-W. corner of the island of the same name in the estuary formed by the rivers Bacanga and Anil. Owing to the special hydrography of that part of the Brazilian coast, and of its proximity to the equator, the port of San Luis has the highest tides in South America.

Navigation on the rivers of this State is carried on by steamers, sailing ships and towed barges. On several rivers, such as the Itapecuru, rafts and *jangadas*, laden with bales ot cotton and other products, may frequently be seen floating down the river with the current. These rafts, coming chiefly from the Picos region, make a voyage of nearly 300 km. as far as Caxias or Rosario, where their cargo is loaded into barges which are towed to the Port of St. Luiz.

River navigation in this State is carried on by the *Companhia de Navegacao a vapor de Maranhao* and the *Companhia Fluvial Maranhense.*

The first-named company owns the following vessels: *Cururupu, Turyassu, Caxias, Cabral, Carlos, Coelho, Mearim* and *Ypiranga*.

The rivers in the State of Maranhao on which these two companies maintain regular services are the Itapecuru, Mearim, Pindare and Mussim.

State of Piauhy.—The Parnahyba River is the principal waterway in this State. The largest traffic on this river is between the Port of Amarraçao, the only sea-port in Piauhy, and Therezina, capital of the State in the interior.

The Steam Navigation Company of Parnahyba, with headquarters at Therezina, maintains two regular river services: (1) from the Port of Parnahyba and (2) from Floriano Peixoto, the first for the lower and the second for the upper part of the river.

Line 1.—North: From Therezina to the mouth of the Parnahyba, the ports of call are: Uniao, Repartiçao, Porto Alegre and Parnahyba.

Line 2.—South: From Therezina to the upper part of the Parnahyba, the ports of call are: Belem, Amarante, Castelhanos, Miguel Alves, Marrocos, Barra do Souza, Sao Francisco, Grajahu and Floriane Peixoto.

The Steam Navigation Company of the Parnahyba possesses 5 steamships, 3 tugs and 10 large barges.

The firm of P.T. de Oliveira & Company also possesses 1 steamboat which navigates the Parnahyba.

State of Ceara.—River navigation in this State is so insignificant that it may be said not to exist. It is only possible for small boats on very short sections, in the lower parts of the rivers, near their mouths, along the tidal reaches. Moreover, during the summer, which never lasts less than seven months, the beds of the rivers are usually dry.

State of Rio Grande de Norte.—There is no steam river navigation in this State; only a few small sailing-boats navigate the tidal reaches of the rivers.

State of Parahyba.—No river navigation, except that carried on by small sailing-boats on the tidal reaches of the river.

State of Pernambuco.—The only river navigation in this State is on the Bahia frontier, along which flows the river Sao Francisco. With this exception, what was said with regard to Ceara, Rio Grande do Norte and Parahyba applies also to this State.

State of Alagoas.—Inland navigation in this State is confined to the lower stream of the Sao Francisco, which forms the frontier with the State of Sergipe, and to the lakes and lagoons (lagoas) from which the State of Alagoas takes its name. The lower Sao Francisco, to an extent of 277 km., is navigated by the *Companhia de Navegacao de Baixo Sao Francisco*, which runs a regular service between the town of Penedo and Piranhas (eastern terminus of the railway from the falls of Paulo Affonso). Boats from Penedo to Piranhas call at the following places: Propira, Collegio, S. Braz, Traipu, Gararu, Ilha de Ouro, Bello Monte, Pao de Assucar and Entremontes.

The fleet employed includes the following steamers: *Sinimbu*, *Maceio*, *Moxoto*, *Paulo Affonso*, *Pendense*, *Ypanema*.

Navigation on the lakes and lagoons is carried on mainly by sailing-boats, large canoes and launches. A petrol-driven boat maintains a passenger service on the northern lakes and the lake Mangaba, which are united by canals and connect the principal towns of this State.

State of Sergipe.—In addition to the service on the lower Sao Francisco mentioned above, this State possesses a line of shipping in the basin of the Cotinguiba, between Aracaju, Maroim, Caranleiras and Riachuele, consisting of the passenger-boats *Laranjeiras* and *Maroim* (60 and 80 tons), tugs, barges and sailing vessels. A steamship service is maintained by the *Empreza Fluvial de Navegacao à Vapor*, established at Aracaju.

State of Bahia.—This State possesses the largest number of good ports in Brazil. A very important company *(Empreza de Navegacao Bahiana)* maintains regular services between the capital and the ports of Maragogipe, Cachoeira, Villa de Sao Francisco, S. Amaro, Jaguaripe, Nazareth, Madre de Deus, Bon Jesus, S. Estovao, Valença, Itaparica and Salinas da Margarida. There are departures once a week for St. Estavao, for Valença and ports of call every fortnight, for Itaparica daily, and for the other ports mentioned above three times a week.

This company employs the following ships: *Conselheiro, Dantas* (200 tons), *Gonçalves Martins* (100 tons), *Nazareth* (100 tons), *Boa Viagem* (100 tons), *Santo Antonio* (100 tons), *Itaparica* (80 tons), *Mauricio Manderley* (60 tons), *Esperança* (50 tons), and *Fé* (50 tons).

State of Espirito Santo.—Although this State possesses a remarkable hydrographic system, of which the Rio Doce, with its string of lakes, is the most striking feature, it has developed its inland navigation very little, and has nothing but small vessels, mainly sailing craft. This is due to the sparseness of population in the interior, especially in the North. The population is mainly to be found upon the sea-coast. Hence the importance of the coasting trade and the small attention paid to inland navigation.

State of Rio de Janeiro.—The rivers in this State are unsuited for navigation. The most important, the Parahyba de Sul, had a line of steamships from Sao Joao da Barra to the port of Sao Fidelis, at its mouth. This service is to-day limited to the first section, between Sao Joao da Barra and Campos. Upon short sections of the same river, which is cut up by rapids, navigation is carried on by small steamers or sailing-vessels not over 1 metre in draught. Navigation on the lakes and lagoons of this State is only of local interest.

State of Sao Paulo.—This State is traversed by great rivers which, descending from the plateau to the Parana Valley, meet with too many obstacles to be suitable for navigation. For this reason the state of S. Paulo does not possess an inland navigation system corresponding to its economic importance. With a view to increasing their traffic, two railway enterprises have organised river transport on certain parts of the rivers Mogy-Guassu, tributary of the Rio Grande, Piracicaba and Tiete. But the line established by the *Compagnie Paulista de Linhas Ferreas e Fluviales* on the river Mogy-Guassu between Port Ferreira, Pitangueiras and its junction with the Rio Pardo (200 kilometres) was abolished in consequence of the construction of a railway-line serving this valley.

The *Uniao Sorocabana Ituana* Railway has established a service covering 126 kil. on the river Piracicaba between the port of Joao Alfredo and the mouth of the Tiete and a service covering 94 kil. on the Tiete between the ports Martins and Ribeiro.

A firm established at Santos runs a river service to the seaport Iguape ; there are three lines, covering 320 kil. in all.

First Line.—Iguape to Xiririca, 154 km., with one modern boat, the *Candide Rodrigues* (36 tons).

Second Line.—Iguape to S. Antonio, one boat (30 t.)

Third Line.—Iguape to Sabauna, one boat.

This service comprises 48 return journeys per year between Iguape and Sabauna ; 36 return journeys between Iguape and Xiririca and 24 return journeys between Iguape and S. Antonio.

State of Parana.—As in the State of S. Paulo, the large rivers flowing through the State of Parana are full of obstacles. River navigation here is accordingly limited to two sections of the Iguassu and Negro rivers.

Iguassu Line.—Between Porto da Uniao and Amazonas (terminus of a branch line of the Parana-Rio-Grande Railway. This service is carried on by five steamships ; it is sometimes interrupted owing to scarcity of water.

Rio Negro Line.—One small steamer.

State of Santa Catharina.—Steamers navigate the rivers Iguassu, Negro, Itajahy, and their branches between the towns of Sao Francisco and Joinville.

This service is maintained by the *Empresa de Navegaçâo Joinvillense* and the *Companhia Fluvial Itajahy*, the first company having two steamships, the second three. *The Companhia Industrial*, together with other firms, has boats employed in goods transport.

State of Rio Grande do Sul.—Inland navigation in this State is of great importance. Besides the great number of small sailing vessels and steamers belonging to private persons, there is a large fleet carrying on regular services as follows :

1st line.—This line calls at the following places : Rio Grande, Jaguarao, Pelotas, Santa Victoria de Palmar and Santa Izabel. The service is kept up by the *Linha Regular de Navegaçao Fluvial*, which possesses four steamers, one tug and a number of barges.

2nd line.—A second service between Rio Grande, Pelotas and Porto Alegre is carried on by the *Transportes Maritimo Telles & Cie.*, which owns three tugs and numerous barges, and by the *Stooss Watchel & Cie*, which owns four tugs and a fleet of auxiliary vessels.

3rd line.—This line connects Porto Alegre with Margem, and carries passengers for the railway from Porto Alegre to Uruguayana, with two departures daily.

4th line.—This line connects Porto Alegre with Sao Lourenço and Sant'Angelo ; it is operated by *J. Becker & Cie.* Two departures per week.

5th line.—This line calls at the following places : Porto Alegre, Santo Amare, Dourado, Rio Pardo, Bexiga, Cachoeira, Passo Seringa, Sao Lourenço Jacuhy, Pau à Pique, Pesqueira, Porto da Estrada, Castro, Macaco, D. Francisco, Porto Alto on the river Jacuhy (about 300 km.).

6th line.—This line connects Porto Alegre with the port of the river Cahy. It is operated by the *Companhia de Navegaçao do Cahy*, which owns two steamers of 60 tons (95 km.).

7th line.—This line connects Porto Alegre with the ports on the river Taquary. It has four steamers, with three departures per week.

8th line.—This line connects Porto Alegre with the ports on the river dos Sinos, with its terminus at S. Leopoldo.

9th line.—From Porto Alegre to Barra da Ribeira; three departures per week.

10th line.—From Porto Alegre to Pedras Brancas; daily departure in both directions.

11th line.—From Porto Alegre to Palmar, on the lagoon dos Patos; two departures per month.

12th line.—From Porto Alegre to Taipes on the lagoon dos Patos ; one departure per month.

13th line.—From Porto Alegre to Gravatahy.

14th line.—From Porto Alegre to Jaguarao and Santa Victoria *(Leivas, Sobrinhos & Cie.)*.

15th line.—Navigating the rivers Ibicuhyb and Uruguay from Cacequi to Uruguayana, Itaqui and Sao Borja.

16th line.—Navigating the Uruguay with three steamers belonging to the *Companhia Ferro Carril Leste Argentina.*

State of Matto Grosso.—Situated far in the interior of Brazil, this State is at a great distance from the sea, but it is traversed by great rivers which flow north or south emptying into the Amazon or the Parana. It is in this region that these two enormous basins come so close to each other that a canal of about 7 km. connecting the river Aguapehy, a tributary of the Jauru, with the river Alegre, a tributary of the Guaporé, would establish a waterway between the Amazon and the Plata. This will suffice to indicate the future of this State from the point of view of navigation. The construction of this canal was begun in 1773 but was abandoned owing to lack of funds. There is every sign that it will be resumed some day.

At the present time communications by water with Matto Grosso are provided by the rivers Parana, Paraguay and their tributaries.

The *Brazilian Lloyd* has two shipping lines on these rivers ; one plies from Montevideo to Corumba along the Parana and the Paraguay, the other from Corumba to Cuyaba along the rivers Paraguay, Sao Lourenço and Cuyaba.

State of Goyaz.— This State is situated far from the sea and, like Matto Grosso, is traversed by large rivers ; but its communications with the other parts of the Republic are mainly by land. The rivers Tocantins and Araguaya are best adapted to extensive navigation. At the present time steamers on the Tocantins do not go further than the port of Alcobaça, 350 km. from Para ; the two vessels on this line are the "Tocantins" (200 tons) and the tug "Alcobaça". Above the port of Alcobaça as far as Praia da Raiha, the course of the river is broken by waterfalls and numerous rapids. Above this section, although there are more waterfalls, navigation is actively resumed, only, however, by sailing vessels, towed barges and punts ; these are small boats which carry salt, or trade in all kinds of goods between the States of Goyaz and Para. Another river, the Araguaya, also lends itself to trade ; it is freely navigable for 1,200 km. in the territory of Goyaz; elsewhere the conditions are the same as on the Tocantins.

Inland navigation, which is carried on particularly for the purposes of the coasting trade, is almost exclusively confined to craft flying the Brazilian flag. But on some of the inland waterways, especially in the provinces of Amazon, Para, Rio Grande do Sul and Matto Grosso, there are also some international services which are operated partly under the Brazilian and partly under foreign flags. International navigation in the interior of Brazil only exists on rivers which are common to this country and to neighbouring republics ; it is regulated by treaties between the countries concerned, which provide for free navigation subject to the constitutional reservation which ensures a monopoly of the coasting trade to the Brazilian flag. The following are the foreign river companies : Argentine, Peruvian, Bolivian, Paraguayian, as well as others of less importance belonging to various nationalities.

Coasting trade on the rivers includes long-distance and local coasting trade. If the features which we have indicated as characterising these two kinds of navigation, and the routes followed by the lines which we have mentioned are borne in mind, it can be readily seen in each case whether the traffic is of an international nature or consists of long-distance or local coasting trade.

Amongst the river ports which constitute the most important centres for the coasting trade, the following may be mentioned : Cruzeiro do Sul, Senna Madureira, Campinas, Porto Acre, Apaporys, Jea Brasileiro, Porto Velho, Manoas, Itacoatiaria, Obidos, Belem, Parnahyba, Penedo, Pelotas, Porto Alegre, Santa Victoria do Palmar, Jaguarao, Uruguayana, Itaqui, Sao-Borja, Corumba, Porto Murtinho, Porto Esperança.

Particulars regarding the sea and river-coasting trade will be found in the section devoted to the sea-coasting trade.

B.—COASTAL NAVIGATION.

Navigation along the Brazilian coasts is of two kinds: (1) coasting trade; (2) port-to-port services maintained by the long-distances lines. In this chapter we shall only deal with the coasting trade; the other question will be dealt with when we come to consider long-distance navigation.

The coast of Brazil has an extent of more than 6,000 km., forming a salient which juts out into the Atlantic. The apex of this triangle is Cape S. Roque; one of its sides extends to the north-west as far as the mouth of the Oyapock, and the other to the south-west as far as the mouth of the Chuy. The bays and inlets on the Brazilian coast afford a great number of safe ports and good anchorages.

Amongst the seaports capable of accommodating vessels drawing more than 6 metres, the following may be mentioned:

State of Para: Belem.
State of Maranhâo: Alvantara and the island of Medo in the Bay of S. Marcos, Tutoya.
State of Ceara: Fortaloza, Mucuripe, Retiro Grande.
State of Rio Grande de Norte: Natal, Bahia Formoza, Pitinga.
State of Parahyba: The ports in the Bay of Traiçâo.
State of Pernambuco: Recife, Tamandaré.
State of Alogoas: Maceio.
State of Bahia: San Salvador (Bahia), Gamamu, Ilheus, Santa Cruz, Cabralia.
State of Rio de Janeiro: Abrahâo (Ile Grande), Buzios, Imbitiba.
Federal District: Bay of Rio de Janeiro or Guanabara.
State of S. Paulo: Santos, S. Sebastiâo, Bom Abrigo (island).
State of Parana: Paranagua, Antonina.
State of Santa Catharina: The Bay of Norte, Ratones, Caieira, Gauchos, Bombas, Itapaceroy.
State of Rio Grande do Sul: Rio Grande, Porto das Torres.

For vessels drawing less than 6 metres there are innumerable anchorages, of which the following may be mentioned:

State of Para: Calçoene, Amapa, Marapinim, Maracanan, Salinas, Bragança, Vizou.
State of Maranhâo: The roadsteads of Meio, Caju, Carnauba, Preguiça, Lago.
State of Piauhy: Amarraçao.
State of Ceara: Aracaty, Choro, Lagoinha, Mundahu, Acarahu.
State of Rio Grande do Norte: Cajahu, Macao, Mossoro.
State of Parahyba: Cabadello, Mamanguapo.
State of Pernambuco: Roadstead of Rio Formoso, Serinhaem, Gallinhas, Pau Amarello, Itamaraca, Goyanna.
State of Alagoas: Camaragibe (5 m.).
State of Sergipe: Roadstead of Rio Real, Aracaju.

State of Bahia : Caravellas (5 ½ m.), Alcobaça, Prado, Bay of Frado, Porto Seguro, Balmonte, Cannavieiras.

State of Espirito Santo : Guarapary (5 m.), Benevente, Victoria, S. Matheus.

State of Rio de Janeiro : S. Joao de Barra, Campos, Imbetiba, Macahé, Angra dos Reis, Mangaratiba, Paraty, Jurumirium, Mambricaba.

State of Sao-Paulo : Palmas (Island of Porcos), Cananéa, Iguape.

State of Santa Catharina : Florianopolis, Garopaba, Imbituba, Laguna, Porto Bello, Sao Francisco, Itajahy.

The tables of distances between the principal coasting ports as given in official documents, will be found in the annexes.

We shall now give a short summary of the coastal navigation of Brazil from the two-fold point of view of local and long-distance coasting trade.

1.—*Long-Distance Coasting Trade.*

Long-distance coasting traffic is carried on in Brazil by various enterprises. There are shipping lines organised as limited-liability companies and others which belong to commercial firms or private individuals.

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The most important of these lines is the *Brazilian Lloyd*.

This company is subsidised by the Federal Government. It possesses a large fleet which is the most important part of the Brazilian merchant marine. This fleet consists for the most part of entirely modern steamers, from the elegant and comfortable packet-boat which plies on the interoceanic, coastal and river routes, to the small vessel used for coasting traffic both by sea and river. This coasting traffic extends to the remotest inland parts of Brazil.

The coastal services which are now maintained by the Brazilian Lloyd — leaving aside for the moment long-distance services — are the following :

TWO NORTHERN LINES. Departures every Friday from Rio de Janeiro.

1. *The Rio-Para line*, with two sailings per month, calling at Victoria, Bahia, Maceio, Recife, Cabedello, Natal, Ceara, Maranhâo, Para.

This service is kept up with three steamers, the *Ceara*, *Bahia* and *Para*.

2. *The Rio-Manaos line*, with two sailings per month, calling at Victoria, Bahia, Maceio, Recife Cabedello, Natal, Ceara, Totoya, Maranhâo, Para, Santarem, Obidos, Parintins, Itacoatiara and Manaos.

This service consists of three steamers, the *Joao Alfredo*, *Acre* and *Manaos*.

SOUTHERN LINE :

3. *The line Rio de Janeiro - Buenos Aires,* with two sailings per month, first and third Wednesday, calling at Santos, Paranagua, Antonina, S. Francisco, Itajahy, Florianopolis, Rio Grande, Montevideo and Buenos Aires.

This line includes the steamers *Siro, Servulo, Dourado,* and *Ruy Barbosa.*

These steamers take passengers for Pelotas and Porto Alegre, with a connection for Rio Grande, and also for the ports in the province of Matto Grosso with a connection for Monte Video.

NORTH - SOUTH LINE :

4. The *line Recife - Buenos Aires,* with two sailings per month on the second and fourth Wednesday of each month, calling at Recife, Maceio, Bahia, Rio de Janeiro, Santos, Paranagua (on the southward voyage), S. Francisco (on the southward voyage), Rio Grande, Montevideo and Buenos Aires.

The steamers on this route are the *Rio de Janeiro, Minas Geraes* and *Sao Paolo.*

These steamers take passengers for Pelotas and Porto Alegre, with a connection for Rio Grande, and also for the ports in the Province of Matto Grosso, with a connection for Montevideo.

THREE AUXILIARY LINES : Two for the South, one for the North, starting from Rio de Janeiro.

5. The *Santa Catharina line,* calling at Santos, Paranagua, S. Francisco, Itajahy, Florianopolis, Laguna.

6. The *Parana line,* calling at Dous Rios, Angra dos Reis, Paraty, Ubatuba, Caraguatuba, Villa Sella, S. Sebastiâo, Santos, Gananéa, Iguape, Paranagua, Quaratuba.

7. The *Sergipe line,* calling at Victoria, Caravellas, P. Areia, Ilhéos, Cannavieiras, Bahia, Aracaju.

TWO LINES OF FREIGHTERS : One for the South, the other for the North, starting from Rio de Janeiro.

8. The *Rio - Para line,* calling at Victoria, Bahia, Recife, Macao, Messoro, Ceara, Maranhao, Para. Boats : *Guajary, Amazonas, Gragança, Tabatinga.*

9. The *Rio – Porto Alegre line,* calling at Santos, Paranagua, S. Francisco, Rio Grande, Pelotas, Porto Alegre. Boats : *Mantiqueira, Mocaina, Borborema, Pyrineus, Cubâtao.*

The tables of distances between the ports served by the Brazilian Lloyd will be found in the annexes. This company, as we have seen, is responsible for the long-distance coasting traffic on the rivers Amazon and Paraguay.

* * *

The National Coastal Navigation Company (Companhia Nacional de Navegaçao Costeira). — A company of which the chairman is M. A. M.

Lage Filho, and which has its headquarters at Rio de Janeiro, carries passengers and goods for the North and South of the Republic under the new contract entered into with the Federal Government in 1915. Its lines are the following :

1. *North-South line,* between Porto Alegre and Recife, comprising the following services :

(a) One voyage per week, both ways, leaving on Thursdays, between Porto Alegre and Rio de Janeiro, calling at Pelotas, Rio Grande, Florianopolis, Paranagua, Antonina and Santos on the outward voyage, and at the ports of Santos, Antonina, Paranagua, S. Francisco, Rio Grande and Pelotas on the return voyage.

(b) One voyage per week, both ways, connecting with the previous service, between Rio de Janeiro and Recife, calling at the ports of Victoria, Bahia and Maceio.

2. *Auxiliary Southern line,* between Rio de Janeiro and Porto Alegre: One voyage per week both ways, calling at Paranagua, Florianopolis, Rio Grande, Pelotas on the outward journey, and Pelotas and Rio Grande on the return journey.

3. *Auxiliary Northern line,* between Rio de Janeiro and Natal, connecting with the previous service. One voyage every fortnight, calling at Bahia, Recife and Cabedello both ways.

4. *Auxiliary line between Rio de Janeiro and Rio Grande do Sul:* Two voyages per month, both ways, between Rio de Janeiro and Rio Grande, calling at Angra dos Reis, Ubatuba, Caraguatuba, Villa Bella, S. Sebastiâo, Santos Cananéa, Iguape, Itajahy, Florianopolis.

5. *Freight service :*

(a) Line between Rio de Janeiro and Mossoro; one voyage per month, calling at ports according to circumstances. This route will be extended as far as Manaos as soon as the company has obtained the ships which it expects to get.

(b) Two auxiliary lines, North and South, sailing according to circumstances : (1) Rio de Janeiro-Porto Alegre line, putting in as required. (2) Rio de Janeiro-Recife line, putting in as required.

In addition to the regular voyages on the above routes, the company undertakes special voyages according to the needs of the ports with which it trades.

In the services subsidised by the Federal Government, the company employs the following vessels : *Itajuba, Itapema, Itapuna, Itauba, Itapura, Itatinga, Itassuce, Itipacy, Itaquera, Itagiha, Itabora.*

In the unsubsidised services, the company uses its other vessels.

In accordance with the regulations governing the merchant marine and the coasting trade, all these vessels have wireless installations.

* * *

Companhia Commercio e Navegaçao, owned by Pereira Carneiro et Companhia, Limitada.—This company, with head quarters at Rio de Janeiro, engages in the long-distance coasting trade for Northern and Southern Brazil.

NORTHERN LINES:

(1) *Rio-Para Line,* calling at Victoria, Bahia, Maceio, Recife, Cabedello, Natal, Ceara, Maranhao.

(2) *Rio-Ceara Line,* calling at Victoria, Ilheus, Bahia, Aracaju, Maceio, Recife, Macao, Mossoro, Aracaty, Cera, Camocim.

SOUTHERN LINES:

(3) Rio-Parana Santa Catharina Line.
(4) Rio-Rio Grande do Sul Line.
(5) Rio Montevideo-Buenos Ayres Line.

This company owns a considerable fleet, among which the following vessels may be named:

Pirangy, Mossoro, S. Luiz, Jaguary, Assu, Araguary, Parahyba, Aracaty, Canoé, Maroin, Natal, Guahyba, etc.

Companhia de Navegaçao, Rio de Janeiro. This company maintains two regular services, one to the North and one to the South, as follows:

1. *Northern Line:* Rio to Caravellas, calling at Itapemirim, Picima, Benevente and Victoria.
2. *Southern Line:* Rio to Itajahy, calling at Santos, Paranagua, Antonina, Florianopolis, S. Francisco.

The *Garcio e Sirio Maritime Service Company* maintains a service of two voyages per month from Rio southwards:

1. *Rio-Iguape,* calling at Angra dos Reis, Paraty, Ubatuba, Cataguatuba, Villa Bella, S. Sebastiao, Santos, Covanca.
2. *Rio-Itajahy,* calling at the same places as 1, and also at Paranagua and Antonina.

Empreza Esperança Maritima Company. has a north and south coasting service from Rio de Janeiro with the steamships *Industrial, Alexandria, Esperança, Belem, Fortaleza, Recifo.*

1. *Northern Line:* Rio to Aracaju, calling at the ports of the State of Bahia and Sergipe.
2. *Southern Line:* Rio Santa Catharina, calling at Santos, Iguape, Laguna.

S. Joâo de Barro e Campos Company carries on coasting trade between the States of Rio de Janeiro and Espirito Santo, and along the coast of the State of Rio de Janeiro between the ports of S. Joâo de Barro and Campos. It owns the following vessels: *Fidelense, Carangola, Pinto, S. Joâo de Barra, Teixeirinha* and *Campos* and also the steamships *Cunha, Pery, Miracema* and *Cachoeire.*

Costa Ribeiro & Cie, headquarters at Rio de Janeiro, carry on coasting trade between Rio de Janeiro and ports in the States of Parana and Santa Catarina.

Long-distance coasting trade is also carried on by companies with headquarters at Bahia, Pernambuco, Maranhâo and Para.

The *State of Bahia Company*, with headquarters at S. Salvador de Bahia, navigates the coast of that and the neighbouring States as follows :

1. *Northern Line:* Two return voyages per month between S. Salvador de Bahia and Recife, calling at : Estancia, Aracaju, Villa Nova, Penedo and Jaragua.
2. *Central Line:* One return voyage per month between S. Salvador and Belmonte, calling regularly at Marahu and Rio das Contas, and when required at Ilheos and Cannavieiras.
3. *Southern Line* : Two return voyages per month between S. Salvador and Mucury, calling at Ilheos, Cannavieiras, Santa Cruz, Porto Seguro, Prado, Alcabaça, Ponta d'Areia, Caravellas and Viçosa. Boats : *Ilhéos, Porto Seguro, Cannavieiras, Marahu, Joquitinhonha, Commandatuba,* and *Guararapes.*

(For distances see Annexes).

Companhia Pernambucana.—This company, which was founded in 1838 with headquarters at Pernambuco, carries passengers and goods from the State of Pernambuco to the States of Parahyba, Rio Grande de Norte, Ceara, and Piauhy and to north, and to the States of Alagoas, Sergipe, and Bahia to the South. It maintains the following lines :

1. *Northern line from Pernambuco to Amarraçao:* Two voyages per month, calling at Parahyba, Natal, Macao, Mossore, Aracaty, Fortaleza and Camocim.
2. *Southern line, Pernambuco-Bahia:* Two voyages per month, calling at Maccio, Ponedo and Aracaju.
3. *Line from Pernambuco to Fernando de Noronha :* One voyage per month. A call is sometimes made at Rocas, for the transport of the staff and material required for the service of the lightthouse on this island.

This company owns the following steamships : *Joboatao, Boberibe, Una, S. Francisco, Jacuhype, Rio Formoza, Camocim, Capeberibe.*

Companhia de Navegação a Vapor de Maranhao.—This Company, which is now controlled by the Government. of the State of Maranhoa, has its headquarters at S. Luiz, and, under the contract concluded in 1915 between this Government and the Federal Government, supplies the coasting service on the following routes :

1. *Northern Line,* between S. Luiz and Belem : One return voyage per month, leaving on the first of each month, calling at Pinheiro, Guimaraos, Cururupu, Turyassu, Carutapeia, Vigeu, Braganca.
2. *Southern Line,* between S. Luiz and Natal (calling regularly) or from S. Luiz to Recife (calling when required), leaving the first of each

month, and calling at Barreirinhas, Tutoya, Amarraçao, Camocim, Ararahu, Fortaleza, Aracaty, Mossore, Macau, Natal and Recife.

3. *Central Line* between S. Luiz and S. Bento (sea and river service); one voyage per month, leaving on the 30th of each month and calling at S. Luiz, Alcantara and S. Bento.

(See table of distances in the annexes).

Amongst the steamships on this service are the following: *Curupuru, Turyassu, Cabral, Carlos Coelho, Mearim, Ypirange, Caxias.*

Amazon Company. (Amazonas Steam Navigation Company Ltd.)—As we have seen, this Company, whose headquarters ar eat Belem, navigates the Amazon and its tributaries, under the contract concluded in 1912 with the Federal Government; it also maintains two maritime services on the noth and south coasts of the State of Para.

1. *Line of the Oyapock* (Northern Service), between Belem and the Oyapock—a voyage of 1,460 miles—18 voyages per annum, calling at Chaves, Bailique, Amapé, Calçoene and Counani.

2. *Pirabas Line* (Southern Service), between Belem and Pirabas, a distance of 400 miles, with 18 journeys per annum, calling at Collares, Porto Salvo, Vigia, S. Caetano, Curuça, Marapanim, Maracanan and Salinas.

2.—*Local Coasting Trade.*

As we have said, the local coasting trade is carried on within the limits of the same State and between those ports of two neighbouring States which are situated near their common frontier. The boats used are principally sailing vessels varying widely in type according to the region and the requirements of the ports, with some steamers of shallow draught. In the local coasting trade there are numerous regular services, while the smaller vessels engaged in it sail at irregular intervals according to the requirements of the trade and the variable conditions of navigability on the coasts which they serve. The tide, the effect of which is felt not only along the coasts but in the rivers and lakes, is an important factor in this navigation. The small coasting trade renders great services to commerce between little-known localities and to the small agricultural industry which is carried on in all parts of the country.

We have seen that great developments have been made in the local river trade and even greater in the maritime local coasting trade. It must not be forgotten that, in almost all Brazilian States, there are small trading services on both sea and river, as a result of which the ports on the coast are kept in constant touch with the most distant ports in the interior.

Among the steamer and sailing vessel services which are engaged in this kind of navigation, we must recall those which are maintained regularly by the large navigation companies mentioned above, and also those which belong to commercial firms or private individuals in the various States of Brazil.

State of Para.—In addition to the regular services from Belem to the northern ports, including those in the island of Marajo, and to the southern ports, voyages are made at irregular intervals, as in all the other States, by small sailing vessels.

State of Maranhao.—The local coasting traffic, both maritime and maritime-river, is highly developed in this State. It is carried on between the capital, St. Luiz, and the ports situated either on the coast or near it, in the bays formed by the rivers, or even further in the interior, on rivers navigable to the numerous steamships and sailing vessels which ply along the coast. Some of these ports are: Caratupera, situated at the junction of the river of the same name with the river Gurupy, 12 km. from its mouth; Tury Assu, on the River Joao, an affluent of the Tury-Assu; Cururupu, a seaport, in the bay of the river Cururupu; Guimaraes, on the bay of Cuman, at the mouth of the river Piricuman; Barreirinhas, on the river Preguiças; Tutoya, the best seaport in the State of Maranhao, at the most westerly mouth of the river Parnahyba.

There is a large number of sailing vessels and a few steamers carrying on active navigation in the bays of S. Marcos and S. Jose. These two bays connect the island of Sao Luiz with the ports of the mainland, such as Alcantara, and with the interior districts by various rivers. The local coasting trade around the Island of Maranhao must also be mentioned. A much-frequented route near the capital is that taking in the Bay of Itaqui, the River dos Coqueiros, the canals Estreito and Mosquito, the Bay do Arraial, Sao Jose Bay and the River Prea, which connects Sao Luiz with the town of Miritiba, at a distance of 12 kilom. from Primeira Cruz, at the mouth of the Prea.

Alcantara, a port on the bay of S. Marcos, is also a centre of maritime-river trade; the rivers Jacaruana, Itapening, Maray and St. Joao das Cortes connect the inland districts with this port.

The local coasting trade in the northern part of the State of Maranhao extends beyond its frontier with the State of Para, and maintains regular communications between the northern ports of Maranhao and those of Para, as far as Belem. In the southern part of Maranhao it extends as far as the port of Ceara. Tutoya, in the State of Maranhao, is the centre of the local coasting trade between the towns on the estuary of the Parnahyba, so that the trade of the States of Maranhao and Piauhy merges at their maritime frontier. The tides are an important factor in the coasting trade of Maranhao.

State of Piauhy.—Local coasting trade is carried on chiefly by small sailing vessels along the short stretches of the coast between the mouth of the river Parnahyba, to the North, and the mouth of the Timonha, to the South; the port of Amarraçao is the principal centre for navigation in this State. It is a centre for local sea and river coasting traffic.

State of Ceara.—This State has several ports which are very active in coasting trade. The chief port is Fortaleza, the capital of the State.

Amongst these ports, which are regularly visited by steamships and sailing vessels, we may mention, besides Fortaleza, the following : *Camovim, Aracaty, Acarahu, Mundahu.* Among the small sailing-craft we may mention the *Jangadas.* These vessels, which sail on the open sea far from the coast, are generally used for fishing, but some of the largest of them take part in the local coasting trade.

State of Rio Grande de Norte.—There is a very active coasting tra d in this State, carried on (particularly as regards the transport of sa small steamers, tugs, large pinnaces, and sailing vessels of various types. The chief ports are the following : Natal, Macau, Areia Branca. Several small ports must also be mentioned : Cangaretama, Touros, Cunhau, Gallinhas, etc.

State of Parahyba.—The commerce of this State is carried on principally through the port of Recife in the State of Pernambuco, but there are also regular small trading services, the centre of which, on the coast, is the port of Cabedello. The chief centre of sea and river trade is the port of Parahyba, capital of the State, situated a short distance from the mouth of the river Parahyba.

State of Pernambuco.—This State has a regular local coasting trade. Maritime traffic is very active, and is carried on by about 100 small steamers and sailing vessels. The coasting trade, which has its centre at the port of Recife, extends to the north beyond the frontier to the ports of Parahyba, and to the south, as far as the ports of Alagoas.

State of Alagoas.—This State possesses a large number of ports, some on the coast itself and others near it, on bays formed by the mouths of rivers or in the inlets of lagoons which communicate with the sea. The principal port is Jaragua, near which is situated the capital of the State. The local coasting trade is very active, and there are regular services between the ports of Barara Grande, Camaragibe, Santo Antonio Grande, Porto das Pedras, Penedo, Cururipe, Pituba, Francez and Barra de S. Francisco. Sea and river traffic is very considerable in this State, owing to its lakes and numerous lagoons.

State of Sergipe.—Local coasting trade is carried on in this State between Aracaju, near the mouth of the river Cotinguiba, and the ports of Estancia and S. Christovao. It may be noted that this State keeps up a very active coasting trade with the neighbouring State of Bahia.

State of Bahia.—The port of Bahia, the centre of the important navigation of this great State, is one of the best ports in Brazil. This State possesses the largest number of ports open to commerce. The coasting trade here is highly developed ; it is carried on by regular services and by a large number of steamers and sailing vessels, which sail at frequent but irregular intervals, between secondary maritime centres such as Ilheos, Porto Seguro, Cannavieiras, Caravellas, etc.

State of Espirito Santo.—Local coasting trade is considerably developed. Victoria is the principal port. This port and those of Piuma, S. Matheus, Benevente, Itaperim benefit by frequent regular services of steamers and sailing craft, not to mention the numerous sailing vessels which call at irregular intervals according to requirements.

State of Rio de Janeiro.—The great port of Rio de Janeiro in the Bay of Guanabara is the centre towards which the whole of the coastal navigation of this State is directed. Small coasting trade, both by sea and by sea and river, is highly developed in this State. The coastal ports which are most frequently used by regular lines are Angra dos Reis, Paraty and Imbetida. The port of Cabo Frio, in the lagoon of Araruama, is a centre of maritime river navigation.

State of Sao Paulo.—The principal centre of coasting trade in this State is the great port of Santos. There are regular and frequent services engaged in sea and river traffic, with terminus at the port of Iguape.

State of Parana.—The two chief ports of this State are Panaragua and Antonina. The port of Guaratabu only gives access to vessels of small draught. The local coasting trade is fairly active.

State of Santa-Catharina.—This State possesses several ports regularly served by numerous steamships and sailing vessels. The best is the port of Sao Francisco, which is one of the best ports in Brazil. Mention must also be made of the ports of Florianopolis (capital of the State), Laguna, Porto Bello, Itajahy, and Garopava, between which the coasting trade is very active. There is also a large maritime-river trade.

State of Rio Grande do Sul.—This State, the interior ports of which are very numerous, possesses only two seaports, Rio Grande and Porto das Torres. The vast sandy plain which forms its coastline is an obstacle to the establishment of other commercial seaports. For this reason the local maritime - river coasting trade is very active, while there is comparatively little purely maritime coasting traffic. The port of Rio Grande is connected by a long canal with the lakes and lagoons of this State. The principal centre for small coasting trade is Porto Alegre, the capital of the State, a very important port constituting a terminus for the great inland waterways of the State and for ocean lines. Porto Alegre is situated on the river Guahyba, and is directly connected with the seaport of Rio Grande by the lagoon dos Patos (Lagoa dos Patos). Polotas, on the river S. Goncalo, is connected with Porto Alegre by the same lagoon. It is here that the greatest activity in the local maritime-river traffic of this State is to be found. Another inland port which is connected with the sea is Jaguarao, on the lagoon of Mirim (Lagoa Mirim) ; it is a port for local coasting trade. This trade is carried on by steamers and sailing vessels of considerable aggregate tonnage. Several navigation companies, such as the Brazilian Lloyd, carry on navigation on the Lagoa dos Patos by large steamers of a special type such as the *Mercedes* and the *Venus* which connect with the regular long-distance coas- ting services.

C.—OCEAN-GOING NAVIGATION.

Ocean navigation is carried on by several lines which maintain regular services, and also by a large number of steamships and sailing vessels making voyages at irregular intervals. Some of the regular lines are Brazilian, and others—more numerous—are foreign. Besides the international service, these lines provide port-to-port services along the Brazilian coast. It must be recalled here that international navigation is not only maritime,—it is also carried on by river.

The following are the Brazilian lines navigating ocean routes :

Brazilian Lloyd :—The Brazilian Lloyd operates the following lines :—

Two lines to Europe :

1. The North European Line—the steam packets *Cuyaba, Santos, Pocone*—connects the principal ports of Brazil with Lisbon, Plymouth, Havre, Antwerp and Hamburg.

2. The Mediterranean Line—the steam packets *Benevente, Maranguape, Macapa*—connects the principal ports of Brazil with Gibraltar, Oran, Algiers, Marseille, Genoa, Barcelona and Almeria.

One line to North America :

3. The North American Line—the steam packets *Avare, Curvello, Uberaba*—connects the principal ports of Brazil with Barbados and New York.

The *National Lloyd.*—(Sociedades anonyma de Navegaçao) maintains a regular service between the ports of Brazil and those of the Mediterrannean, especially Marseilles, Genoa and Barcelona, and also various services along the Brazilian coast.

This company owns the following steamships : *Asia*, 6,000 tons ; *Europa*, 6,000 tons ; *Belem*, 4,500 tons ; *Campeiro*, 4,000 tons ; *Campinas*, 3,500 tons ; *Marne* 4,000 tons ; *Piave* 4,000 tons ; *Neuquen* 2,500 tons ; *Rio Amazonas* 2,500 tons ; *Natal* 2,000 tons ; *Antonina* 2,000 tons ; *Campista* 1,500 tons ; *Guanabara* 1,250 tons ; *Brazil* 2,000 tons ; *Italia* 2,000 tons ; *Pernambuco* 1,500 tons ; *Cananea* 1,000 tons ; *Ubatuba* 1,000 tons ; *Serido* 700 tons ; *Coronel* 350 tons, and *Ailda* 500 tons.

Besides these companies, there are also the following : *Lloyd Transatlantico Brasiliero,* and *Empreza de Navageçao Hoepeck.*

Note.—The steamers on river and coastal services use wood fuel and also — particularly the Brazilian Lloyd (on all its lines) — Brazilian coal mixed with foreign coal.

Foreign Companies.

As regards foreign companies we shall merely draw up a list according to nationality :—

American companies :

American Hawaiian Steamship Company.
United States Shipping Board.
Standard Oil Co.
Crowel and Thurlow Steamship Co.
A. H. Bull Steamship & Co.
The Texas Co.
Munson Steamship Line.
Pan-American Petroleum & Transport Co.
Anglo-American Oil Co., Ltd.

Argentine companies :

Sociedad Anonima de Navigacion Sud Atlantica.
Marina Mercante Argentina.
Argentine Navigation Co. Ltd. (Nicolas Mihanovich).
M. R. Podesta.
C. N. Santiago Laimbruschini.

Belgian companies :

Lloyd Royal Belge.

Danish companies :

Det Forened Damskibs Selskab.
P. Brown Jnr. & Co.
C. H. Hansen.

French companies :

Société Générale des Transports Maritimes à Vapeur.
Compagnie Française de Navigation à Vapeur Chargeurs Réunis.
Compagnie de Navigation Sud-Atlantique.

Spanish companies :

S. C. Pinillos, Izquierdo & Compania.
Compania Transatlantica.

Dutch companies :
Koninklijke Hollandsche Lloyd.
Koninklijke Nederlandsche Stoomboot.

British companies:

Royal Mail Steam Packet Company.
Pacific Steam Navigation Co.
Prince Line Ltd.
Lamport & Holt Ltd.
Harrison Line.
Booth Steamship Co. Ltd.
Hugh & William Nelson Ltd.
Eagle Oil Transport Co. Ltd.
Furness Withy & Co. Ltd.
Bay S. S. Co. Ltd.
Edward Hain & Son.
Rankin & Gilmour Co. Ltd.

Italian companies:

Navigazione Generale Italiana.
Sociéta di Navigazione Lloyd Italiano.
Lloyd Sabaudo (Sociéta Anonima).
Sociéta di Navigazione Transatlantica Italiana.
Lloyd del Pacifico.
Soc. Nazionale di Navigazione G. Ansaldo & Ci.
Soc. Anonima di Navigazione Cosulich.
La Veloce Navigazione Italiana.

Japanese companies:

Nippon Yusen Kabushiki Kaisha.
Osaka Shesen Kabushiki Kaisha.

Norwegian companies:

Wilh. Wilhelmsen.
Wilhelm Terkildsen.
Det Nordenfjelske Dampskibsselskab.
Jacob R. Olsen.
Det Bergenske Dampskibsselskab.

Swedish companies:

Axel Axelson Johnsson.
Rederiaktiebolag Svenska Lloyd.
G. Carlsson.

As we pointed out at the beginning of this statement, there is a great deal of information which we are unable to supply in a complete form, owing to the inadequacy of statistics regarding Brazilian navigation and the very short time which we have had at our disposal.

Moreover, it should be observed that navigation statistics, both in Brazil and elsewhere, are not yet compiled on a scale proportionate to the requirements of the modern transport industry. There are, it is true, in Brazil official departments whose duty it is to collect the necessary information on this subject. Thanks to the efforts of the General Inspection of Navigation (Inspecteria General de Navegaçao), the Directorate of Commercial Statistics (Directeria de Estatistica Commercial), and of the Finance Ministry, a large number of documents are available on the various questions affecting national navigation. But we are fully aware of the necessity of improving this service.

For this purpose it would be advisable to establish an international body which, as a result of its position, would be able to gain a general impression of the needs of all countries taken as a whole, and would be able to institute general and uniform methods for the necessary research, to create a common system of statistics and to issue instructions which would guide the national services. We shall undoubtedly have such a body in the near future when the Advisory and Technical Commission of Communications and Transit comes into being.

And now, to complete this review, we must give a survey of our great modern ports.

ANNEX I.

Arrivals of Steamships and Sailing Vessels according to Flag, including repeated Arrivals. Ocean and Coasting Lines.
(January to June.)

FLAG.	NUMBER.					NET TONNAGE.				
	1916	1917	1918	1919	1920	1916	1917	1918	1919	1920
German	—	—	—	—	16	—	—	—	—	45,514
American	149	126	99	225	320	402,750	346,943	147,338	430,316	961,873
Argentine	348	278	281	340	342	160,698	98,283	59,064	76,354	88,047
Belgian	4	—	1	6	56	7,396	—	1,222	13,841	156,856
Bolivian.	—	1	17	—	—	—	162	2,190	—	—
Chilian	1	—	2	12	6	1,653	—	4,779	6,960	6,153
Cuban	—	—	—	1	1	—	—	—	1,177	1,309
Danish	32	29	53	24	17	43,043	49,829	95,959	46,060	38,493
Finnish	—	—	—	1	—	—	—	—	628	—
French	125	105	82	101	204	446,773	381,978	288,399	332,416	781 853
Greek	19	16	11	—	19	38,667	21,482	22,089	—	48,411
Spanish	41	37	15	28	13	122,157	98,747	32,080	50,069	26,365
Dutch.	120	29	3	39	116	485,319	105,545	7,392	196,473	424,076
British	639	416	420	457	1,001	2,089,214	1,301,163	1,267,800	1,458,561	3,300,102
Italian	96	51	60	51	164	272,730	144,706	184,869	179,821	538,475
Japanese	2	8	13	26	40	4,849	26,190	51,073	100,784	146,667
Mexican.	—	1	—	—	—	—	3,236	—	—	—
Norwegian	94	143	118	125	132	164,496	268,619	208,452	222,982	311,900
Paraguayan	72	50	153	15	5	15,346	17,790	52,997	2,630	320
Peruvian	4	8	—	9	4	512	431	—	4,828	911
Portuguese	5	4	7	3	17	1,142	1,250	5,841	634	6,453
Roumanian.	—	—	—	—	1	—	—	—	—	2,408
Russian	12	3	1	1	5	3,173	2,402	1,682	3,398	14,627
Swedish	45	35	32	40	47	106,511	77,418	47,077	95,813	114,289
Uruguayan	36	37	38	45	35	20,304	8,894	7,235	12, 370	10,714
Total Foreign. . . .	1,844	1,377	1,406	1,549	2,561	4,386,733	2,955,068	2,427,556	3,236,055	7,085,815
Total Brazilian. . .	9,145	8,855	9,897	9,792	10,042	4,358,907	4,134,666	5,130,556	4,697,598	4,837,463
Grand Total	10,989	10,232	11,303	11,341	12,603	8,745,640	7,089,734	7,558,112	7,933,653	11,923,278

ANNEX II.

Departures of Steamships and Sailing Vessels according to Flag, including repeated Arrivals. Ocean and Coasting Lines.
(January to June.)

FLAG.	NUMBER.					NET TONNAGE.				
	1916	1917	1918	1919	1920	1916	1917	1918	1919	1920
German	—	—	—	—	16	—	—	—	—	45,514
American	146	124	102	224	329	387,317	332,430	156,278	415,047	949.805
Argentine	350	280	280	341	352	161,319	100,408	58,447	75,870	94,440
Belgian	4	—	1	4	55	7,306	—	1,222	8,894	155,013
Bolivian	—	1	17	—	—	—	162	2,190	—	—
Chilian	1	1	2	13	6	1,653	1,640	4,797	8,137	6,149
Cuban	—	1	—	1	1	—	1,368	—	1,777	1,309
Danish	33	33	53	25	16	43,204	51,549	98,339	45,286	37,304
French	125	106	81	105	202	446,773	381,984	226,412	328,205	772,017
Greek	18	17	10	—	19	36,642	24,152	20,503	—	48,413
Spanish	42	38	14	28	13	125,824	100,079	29,359	51,284	26,365
Dutch	121	30	2	39	115	448,284	100,073	5,105	196,473	339,749
British	648	421	415	459	1,005	2,094,281	1,310,460	1,249,975	1,441,169	3,366,878
Italian	97	52	61	52	163	272,782	147,536	188,555	181,687	536,496
Japanese	2	8	13	23	39	4,849	26,190	51,073	89,379	145,878
Mexican	—	1	—	—	—	—	3,236	—	—	—
Norwegian	102	140	117	118	133	173,454	263,796	205,061	209,162	313,442
Paraguayan	72	50	153	15	5	15,346	17,700	52,997	2,630	320
Peruvian	4	8	—	9	4	512	431	—	4,828	911
Portuguese	6	6	6	3	17	1,268	1,954	10,071	634	6,244
Roumanian	—	—	—	—	2	—	—	—	—	4,801
Russian	12	3	—	1	4	3,173	2,402	—	3,398	12,234
Swedish	45	32	30	41	47	104,006	72,946	45,144	97,154	113,018
Uruguayan	36	37	38	45	32	20,304	8,894	6,621	12,450	8,405
Total Foreign	1,864	1,389	1,395	1,546	2,575	4,388,787	2,958,480	2,412,149	3,172,862	6,984,705
Total Brazilian	9,208	8,792	9,917	9,722	10,083	4,373,009	4,121,421	5,171,404	4,682,901	4,801,772
Grand Total	11,072	10,181	11,312	11,268	12,658	8,761,796	7,079,901	7,583,553	7,855,763	11,786,477

ANNEX III.

Table of Distances:

(Distances in miles)

Lines.	Distances between ports.	Distances from first port.
I. — North-South Line.		
Rio	0	0
Santos	210	210
Paranagua	170	380
Sao-Francisco	65	445
Rio Grande	445	890
Montevideo	310	1,200
Buenos-Ayres	120	1,320
Montevideo	120	1,440
Rio Grande	310	1,750
Santos	640	2,390
Rio	210	2,600
Bahia	720	3,320
Maceió	270	3,590
Recife	120	3,710
Ceara	405	4,115
Belem	575	4,690
II. — Northern Line.		
Rio	0	0
Victoria	265	265
Bahia	475	740
Maceió	270	1,010
Recife	120	1,130
Cabedello	72	1,202
Natal	80	1,282
Fortaleza	70	1 552
Tutoya	250	1,802
Sao-Luiz	160	1,962
Belem	360	2,322
Santarem	517	2,839
Obidos	68	2,907
Parintins	95	3,002

ANNEX III (continued).

Table of Distances:

(Distances in miles).

Lines.	Distances between ports.	 from first port.
Itacoatiara	137	3,139
Manaos	110	3,249
III. — Southern Line.		
Rio	0	0
Santos	210	210
Paranagua	170	380
Antonina	12	392
Paranagua	12	404
Sao-Francisco	65	409
Itajahy	60	529
Florianopolis	45	574
Rio Grande	360	934
Montevideo	310	1,244
IV. — American Line.		
Santos	0	0
Rio	210	210
Bahia	720	930
Recife	390	1,320
Para	1,140	2,460
S. J. Porto Rico	1,800	4,260
New York	1,407	5,667
V. — Amarraçao Line.		
Rio	0	0
Victoria	265	265
Bahia	475	740
Maceió	270	1,010
Recife	120	1,130
Cabedello	72	1,202
Natal	80	1,282
Macau	150	1,432

ANNEX III (continued).

Table of Distances:

(Distances in miles.)

Lines.	Distances between ports.	Distances from first port.
Mossoro	40	1,472
Aracaty	56	1,528
Fortaleza	67	1,595
Acarahy	120	1,715
Camocim	50	1,765
Amarraçao	55	1,820
Parahyba	10	1,830
Amarraçao	10	1,840
Tutoya	55	1,895
Maranhao	150	2,045
VI. — Sergipe Line.		
Rio	0	0
Cabo Frio	75	75
Victoria	200	275
Caravellas	190	465
Ponta d'Areia	3	468
Ilheos	185	653
Bahia	115	768
Aracaju	165	933
Villa Nova	65	998
Penedo	3	1,001
Maceio	80	1,081
VII. — Laguna Line.		
Rio	0	0
C. Dois Rios	65	65
Santos	150	215
Cananea	125	340
Iguape	35	375
Cananea	35	410
Paranagua	55	465
S. Francisco	65	530

ANNEX III (continued).

Table of Distances:

(Distances in miles.)

Lines	Distances between ports.	Distances from first port.
Itajahy	60	590
Florianopolis	45	634
Laguna	60	695
VIII. — Guaratuba Line.		
Rio	0	0
Angras dos Reis	70	70
Paraty	25	95
Ubatuba	48	143
Caraguatuba	30	173
Villa Bella	10	183
S. Sebastiao	4	187
Santos	65	252
Canenea	125	377
Iguape	35	412
Cananea	35	447
Paranagua	35	482
Guaratuba	50	532
IX. — Lagune Mirim Line.		
Rio Grande	0	0
Pelotas	27	27
Jaguarao	86	113
Santa Victoria	72	185
X. — Lagune des Patos Line.		
Rio Grande	0	0
Pelotas	27	27
Porto Alegre	150	177
XI. — Matto Grosso Line.		
Montevideo	0	0
Humayta	638	638

ANNEX III (continued).

Table of Distances:

(Distances in miles.)

Lines.	Distances between ports.	from first port.
Asumcion	154	792
Apa	351	1,143
Porto Martinho	33	1,176
Porto Coimbra	149	1,325
Porto Esperança	33	1,358
Corumbà	83	1,441
Cuyaba	200	1,641
XII. — Various Lines.		
Rio	0	0
Buenos Ayres	1,320	1,320
Bahia Blanca	580	1,908
Rio	0	0
Buenos Ayres	1,320	1,320
San Nicolas	185	1,505
Rio	0	0
Buenos Ayres	1,320	1,320
Rosario	218	1,538

D.—PRINCIPAL PORTS.

Port of Manaos.—This port, which is situated on the left bank of the Rio Negro, at about 14 km. from the point at which it joins the Amazon, is subject to alternate periods of six months high water and six months low-water, the flood period being generally from December to May, the low-water period from June to November. During the first period the Rio Negro is at about street-level along the quay, so that ships can lie alongside for unloading, whereas during the low period the shore is completely dry from the base of the quays to water-level a distance of 100 to 150 metres. The difference in water level between these two periods is 15 metres, sometimes even more.

It is easy to understand, bearing in mind the peculiar conditions existing at Manaos, how necessary it was to improve the port, so as to enable steamers of deep draught making use of this important commercial centre to load and unload in any sort of weather.

Provisional works were carried out with the necessary speed, and followed later by improvements of a more permanent nature.

The temporary works comprised :

A wooden landing stage 110 metres long by 70 metres wide on piles of tarred pinewood, cross-section 0 m. 25 by 0 m. 25 ; parallel to this landing stage, and at a distance of 100 m., a floating pontoon measuring 103 m. 60 by 20 m. 50, provided with three metal towers. These three towers are 23 metres in height and correspond to three similar towers on the landing stage, and are used for overhead carriage from the pontoon to the warehouses. Three electric motors, of the Westinghouse railway type, are mounted on these three towers, each with a drum for winding cable. They are each of 75 h.p., 220 volts direct current.

This interesting solution of the problem of loading and unloading goods in a port like Manaos, which is subject to such differences of water-level, was devised by engineer, A. de Lavandeyra, who was also responsible for the other plans for development of this port.

The permanent works which were carried out by the *Manaos Harbour Limited*, contractors for the improvement and operation of the port, are briefly as follows :

A large floating pontoon ; a landing-stage for different water-levels, a quay wall ; an embankment between the quay and the shore ; a series of warehouses for receiving, storing and distributing all goods loaded and unloaded at Manaos ; a building for the customs, and a large floating dock ; a building for repair workshops and an electric power station.

All the warehouses, floating pontoons and quays are lighted by electricity, and have telephones and fire alarms. As a precaution against fire, there is a large reservoir always full, directly connected with the mains leading to the different warehouses and buildings of the company.

For transport, both inside and outside the warehouses, there is an improved system of electric tractors.

* * *

Port of Para.—This port, which is named after the most northerly State in the Brazilian Federation, is situated at the mouth of the Amazon. This means that it is the natural outlet for the vast region which forms about a third of the South American Continent, and which is intersected by the Amazon's remarkable network of navigable tributaries. It is 738 marine miles from Oyapock, the most northerly point on the Brazilian seaboard.

The contract for improving and operating the port has been assigned by the Government to the Para Harbour Company.

The works carried out by this company are mainly as follows :

1. 5 km. of entrance channel, dredged to a depth of 9 m. 25, providing access to the wharves. This channel is equipped with light buoys which enable it to be used even at night.

2. 1,943 metres of wharves—1,260 metres for sea-going vessels, 226 for river vessels, and 457 metres forming a special dock for ships of shallow draught. The company in addition makes use of an old wharf of small depth 360 metres in length and of the old dock of Vero Pezo, also very shallow.

3. 34 hectares of ground reclaimed from the sea behind the new wharves, on which stand :

Thirteen ordinary warehouses of a total available area of 26,000 sq. metres.

Two two-storied warehouses of a total available area of 9,600 sq. metres.

The wharves and warehouses are equipped with electric cranes.

4. A rampart 1,850 metres in length and 30 metres wide.

5. An electric power-station.

6. Outside the port, at a short distance downstream, on some land called " Val-de-Caes ", which belongs to the company, works have been installed for the repair of ships, comprising :

Two floating docks of a capacity of 1,800 tons each for the upkeep and repair of vessels ; three dry docks for river craft, capacity 800 tons each ; a large repair workship including foundry, flatting mill, forge, etc.

A special wharf is reserved for these buildings.

7. A depot for inflammable materials, built on the property known as " Miramar ", adjoining Val-de-Caes, and also belonging to the company. This depot includes a landing stage built on metal piles of a depth of about 10 metres.

8. A coal depot with movable hoppers on the wharf reserved for sea-going ships.

9. A submerged dyke on the western side of the entrance channel for diverting the tidal current in order to keep a uniform depth in the channel.

10. Three mazout reservoirs on the "Miramar" property holding 24,000 tons of mazout; the foundations are laid and the preliminary work finished; the reservoirs themselves are being erected.

11. The construction of building for the customs, postal and telegraphic services is for the time being postponed.

* * *

Port of Pernambuco.—This recently constructed port is situated in the State of the same name, in the most eastern part of South America. Before being equipped with the technical appliances which improved it, it was, as a natural port, sheltered behind a line of rocks which rises at about 300 metres from the coast. It was much used in cruises from Europe to America and *vice versa*, or between Northern and Southern Brazil. But in order to adapt it to modern navigation, it was essential to improve nature's work by adding the complete equipment needed in a port suited for a large amount of traffic. With this object, the Federal Government has had these improvements carried out, under contract, by the Pernambuco Harbour Construction Company, along the lines proposed by a commission of Brazilian engineers presided over by M. Alfredo Lisboa.

a) *Protective Works.—Nogueira Dyke.*—This dyke closed the southern extremity of the harbour. Starting from the coast, it forms a link with the line of reefs. It is a wall of rough stones, 1,200 metres long. The platform stands 4 metres above water and has a width of 3 metres.

Wall on the reefs.—This wall is 3,000 metres long, and is built on the natural reef which formed the shelter of the original harbour. Its platform is 3 m. 50 wide and is surmounted by a protecture parapet on the sea side 2 metres in height.

Breakwaters.—At the end of the wall and prolonging it is a breakwater 1,147 metres in length. It is built of rough blocks varying in weight from 100 to 10,000 kilogrammes. On this rough wall there is a platform 10 metres wide built of artificial blocks of 35 tons and surmounted on the side next the sea, like the wall, by a parapet 2 metres high, serving as shelter against breakers.

Pier of Olinda.—At about 300 metres from the end of the breakwater is the extreme point of Olinda Pier, which starts from the isthmus of the same name. This pier is built entirely of rough blocks. Its top is 4 metres above low water, and it is 800 metres long. It protects the port against the north-east winds.

b) *Entrance Channel to the wharves.*—Between the head of the Olinda Pier and the end of the breakwater is the entrance to the harbour, 300 metres wide and 10 metres deep. The channel, which starts here, is dredged to a depth of 9 to 10 metres in the outer harbour and near the docks, and the rest of it to a depth of 8 metres.

c) *Wharves.*—The wharves are composed of artificial blocks laid in courses, the first course resting on a foundation of rough stone 2 metres thick. There are four courses in the 8-metre wharves, and 5 in the 10-metre wharves. On the last course, 1 m. 28 in height, rests the masonry portion of the wharves. The masonry portion is built up to 4 metres above high-water mark. On the top, capstans are set in at 30 metres intervals, and ladders are set into the side of the wharves at 60 metres interval, for the use of boats and launches.

Other wharves have been constructed, some of 4 m. 50, and others 2 m. 50 in depth ; the former can be used by coasting vessels, the latter are rather in the nature of protective walls, although vessels can berth there as well.

Length of 10-metre wharves	956	metres
» 8-metre wharves	1,706	»
» 4.50 and 2.50	564	»

Equipment of Quays.—Warehouses are situated along the quays, covering a total area of 26,400 square metres ; also a coal depot with an area of 23,000 metres ; an electric power-station with an area of 500 square metres ; eleven 1 ½-ton cranes, three five-ton cranes, a belt carrier and three transhippers.

The coal depot is not yet completed, but work on it has been commenced. This depot, situated at the extreme end of the 10 m. wharves, close to the harbour entrance, and protected by the breakwaters, will simplify the coaling of big vessels. It is equipped with two transhipment bridges, a lift, and a coal lighter.

Railway Lines.—The port also has 9,500 metres of railway lines for handling traffic on the wharves.

* * *

Port of Bahia.—The port of Bahia, which has only recently been constructed, is situated in the bay of the same name to the south of the port of Pernambuco. The bay is well sheltered, but in order to enable the largest steamers to load and unload their cargoes directly upon the wharves, a Brazilian company was formed in 1902 known as the Bahia Docks and Port Concessionary Company, which subsequently handed over the construction of the port to the Bahia Port Construction Company. The latter consisted of French financiers and technical experts, under the direction of M. E. Quellennec.

The port, which has a total area of 100 hectares, is quadrilateral in form, two sides consisting of breakwaters and the other two of the wharves.

(a) *Protective works.*—Breakwaters.—The port is protected by two breakwaters ; one, known as the southern outer breakwater and measuring

920 metres in length, runs at right angles to the coast ; the other, called the inner breakwater, runs parallel with the coast, and is 1,110 metres long.

(b) *Wharves.*—The wharves are built out into the sea for an average distance of 200 metres. They comprise :

One wharf for coasting steamers, 200 metres long at right angles to the coast.

One wharf 1,450 metres long at which, even at low tide, vessels drawing as much as 8 metres can berth.

One wharf 855 metres long suitable for the largest vessels drawing 10 metres ; this wharf is connected with the coast by a dyke more than 1,000 metres long.

In order to build these wharves it was first of all necessary to build a wall in the water ; when this had been done, and a kind of barrier had thus been erected, the space between the quay wall and the shore was filled up. In this way enormous stretches of land were reclaimed from the sea, and on this land have been constructed sheds, depots, warehouses, customs buildings, railway sidings, cranes, etc., all of which are indispensable for the operation of the port.

The quay wall was built by placing blocks weighing from 80/100 tons on the bottom. The inner breakwater and the most advanced part of the outer breakwater are supported on reinforced concrete caissons measuring 340 and 400 cubic metres, which were floated out and sunk in their final position.

(c) *Plant.*—In addition to the depots and cranes, the wharves are equipped with a railway with seven locomotives and 500 wagons, and also with an electric power station of 700 horse-power, and a foundry.

⁂

Port of Rio de Janeiro.—This port is situated in the bay of the same name, celebrated for its beauty. Its trade, which is constantly growing, amounted in 1902 to rather more than 1 million tons imports, and one and a half million tons exports.

The port was completed in 1911. The works carried out comprise :

1. Dredging a channel giving access to the quays, and dredging in front of the quays to a depth of from 8 to 10 metres.
2. The construction of wharves 3,355 metres in length and 8 metres in depth for 1,500 metres, and 10 metres in depth for the remainder (1,855 metres).
3. Filling in behind the wharves, and thus reclaiming 83 hectares of land for use in connection with the part.
4. The construction of 10 warehouses measuring 100 × 136 metres.
5. The installation of ten 5-ton cranes and 25 1.5-ton cranes on the wharves and of 60 movable cranes in the warehouses.

In building the quay walls the French "Hersent" system of caissons with compressed air, modified to suit local requirements, was adopted. The work was carried out under the direction of MM. Francisco Bicalho and Delvechio. The caissons were lowered and, when necessary, raised, from a floating dock consisting of two pontoons connected by a strong platform ; once the caisson was in place the wall was built between the two pontoons. The floating dock was fitted with an apparatus for producing electric power and compressed air for the caissons.

The construction of the quays was a matter of extreme difficulty owing to the great depth to which it was necessary to descend in order to find bedrock, and also owing to the unevenness of the bottom. Bedrock was found at a depth of 18 metres and in some places even of 22 metres below the surface of the water. Before reaching rock-bottom the caisson rested on sand and mud which could be permeated with air, so that at a certain depth the air escaped through the soil, and the necessary pressure could not be kept up in the work chamber. This difficulty was overcome in the following manner : three barge-loads of clay were emptied into the water against the sides of the caisson. This clay compressed the mud so that the air under pressure could no longer escape through it. The earth was then dug away from inside the work-chamber, first under the four corners of the caisson and then under its edges, so that it finally rested entirely on the rock.

On other sections of the wall the rock-bottom was so uneven that it was necessary to excavate to a depth of about one metre at one corner of the caisson and to build up for a height of two metres a support under the opposite corner.

The Walker firm succeeded, however, in overcoming all these difficulties.

The extent of the dredging and filling work is shown in the following figures :

	cubic metres.
Dredging channel and in front of wharves.	7,750,000
Fill behind the wharves	6,500,000

This space was filled with three million cubic metres of sand dredged or pumped, and with two and a half million cubic metres of material from the hill " Morro do Senado ", situated in the centre of the town at a distance of 5 kilometres from the works ; this material was carried by tramway to the port.

* * *

The Port of Santos.—The Port of Santos is one of the largest centres in Brazil for import and export trade. Goods for the whole State of Sao Paulo and for parts of Minas-Geraes, Goyas, and even Matto-Grosso, are distributed from this centre. From this point also the products—including coffee—of the first-named State are despatched to foreign countries ;

also some of the products of the last two States, particularly livestock, which is killed, and the meat frozen, in the cold storage slaughter-houses of Sao Paulo.

This port is completely sheltered by the natural conformation of the coast and by the island of S. Vicente. The Brazilian Government has appointed a Commission of Enquiry. under the direction of the engineer Sergie de Saboia, to consider plans for its improvement.

Tenders were invited for carrying out this engineer's plan, and the contract was awarded, by decree of July 12, 1888, to M. J. P. de Oliveira, who organised the undertaking through Gaffréo, Guinle and Company, under the name " Melhoramentos de Porto de Santos ". In 1892 this undertaking was transformed into a limited liability company under the name " Companhia de Santos ". This company, employing exclusively Brazilian capital and experts, carried out all the work which has given Santos a completely modern harbour.

The quay-walls are of masonry and hewn stone, rising 1.50 metres above high-water level ; they are reinforced by a wall of rough stone, and this supports the embankment which connects the wharves and the shore.

The foundations of the quay walls are large blocks, and embedded in the bottom to a depth of 1 to 3 metres. The wall thus formed is 7 metres high ; its width varies from 3.80 to 5.7 metres according to the nature of the ground. The foundations rise to low-water level ; above that the wall is built of masonry to a height of 1.80 metres above high tide. It has a revetment (talus) of 1.10 metres.

In front of the wharves the port is dredged to a depth of 8 metres below low-water mark, thus allowing free access for trans-Atlantic vessels. The length of the wharves is more than five kilometres. Along the wharves a strip 20 metres wide has been provided for the movement of traffic, and another, 35 metres wide, for warehouses, stores, machinery, cranes and three lines of rail, connected with the S. Paulo railway, for handling goods. Some of the fixed and movable cranes have a lifting capacity of 6 to 20 tons, and are worked by steam ; others, with a lifting capacity of 1,500 kgm. are worked by hydraulic power. The warehouses, built of iron or masonry, measure 75 by 24 meters ; others, more recent, measure 200 by 30 metres ; all are equipped with movable cranes and with rails and turntables.

⁂

Port de Rio Grande do Sul.—The State of Rio Grande do Sul is the most southern of the Brazilian Federation. The principal port of this State — through which its very considerable export passes — is Rio Grande, situated on the right bank of the North Canal, which joins Lagune dos Patos (a sort of immense inland sea) to the Atlantic Ocean, and which is also connected with the neighbouring Lagune de Mirim.

The concession for works was granted by the Federal Government in September 1906 to the American engineer Almer Lawrence Corthell, who ceded it to an American company " The Port of Rio Grande do Sul Co.", which in turn ceded it, in 1908, to the " Compagnie Française du Port de Rio Grande do Sul", established in July 1908 with a capital of Fr. 30,000,000. This company had the work carried out by the " Société Générale de Construction ", a French company under the chairmanship of M. E. Quellenec.

The works in the port of Rio Grande commenced in 1909 include :—

1. *The Bar.*—The bar consists of two rock jetties, each about 4,000 m. long, starting from the Atlantic coast east and west of the mouth of the North Canal ; the cubic measurement of these jetties is well over 2,000,000 cubic metres. These two jetties canalise the channel, and a depth of about 10 m., providing free access to the port, has thus been obtained without recourse to dredging.

2. *The Port.*—a) Wharves : The port comprises a first section of 1,500 m. of wharves and another section of 1,000 m. capable of receiving boats with a draught of 10 m. and built of concrete blocks placed upon walls of rough stone.

b) Dredgings : The dredgings include : a channel (depth 19 m. 40) 130 m. wide and 2 km. in length, connecting the North Canal with the new port ; an outer harbour 400 metres long ; the main harbour 1,500 metres in extent, bordered by a rectilinear wharf of concrete blocks ; a channel (4 m. 20 in depth and about 700 m. in length) at the end of the new port and linking it up with the old port. These dredgings amounted to a total of at least 8,000,000 cubic metres of material, used in filling up an area of about 300 hectares.

c) The installations and plant comprise railways, waterducts, drains and various buildings ;

Two warehouses 100 m. by 20 m. fitted in each case with electric transporters of 1,500 kg. capacity.

A central electric power station with direct current of 500 volts for lighting and motive power, about 35 cranes and electric capstans, 2 coal transhippers, about 50 ordinary or light buoys and 3 harbour lights, 2 small lighthouses, an oil gas works, etc.

The State of Rio Grande do Sul has bought back the contract for the construction and operation from the French company of the Port of Rio Grande, of which it is at present the concessionary ; the contract was assigned in consideration of payment for the work done—*viz.*, wharves, installations and warehouses, amounting to a sum of 70,000,000 (1919).

Further, the Federal Government has taken over the Bar, compensating the same company for the actual cost of the works mentioned under that heading.

⁂

REGIME OF PORTS.

There are two kinds of contracts adopted for the construction and operation of Brazilian ports.

Under the first system, in accordance with the decrees of 1903 and 1907, the Government assumes responsibility for the work, which it carries out with its own resources, either through contractors or directly ; and when these are completed it hands over the operation, under short contracts in order to adapt the taxes, at intervals, to the necessities of commerce and navigation.

In fulfilment of these decrees, the ports of Rio de Janeiro and of Recife (Pernambuco) have been rented, the first in 1910 for a period expiring in 1921, and the second provisionally.

The second type of contract takes the form of concessions based on the decree of 1869. Under this arrangement the work is done by contractors and is paid for by approved taxes, on condition that after a certain period the works, installations, etc., return to the Government. This is the system adopted for the ports of Manaos, Para, Bahia, Santos and Rio Grande do Sul, as well as in that of Victoria (State of Espirito Santo), still in course of construction.

BULGARIA.

I.

RAILWAYS.

All the railways of national importance mentioned in the present notes are worked entirely by the State. The figures given are for the normal-gauge railways. Bulgaria possesses, in addition, narrow-gauge railways (60 and 75 cm. gauge) with a total length of 346 km., but these are only of local importance.

1. *Length of System.*—In 1911 the State possessed a normal-gauge railway system with total length of track of 1,931 km. In 1920 the Bulgarian railway system had a total length of track of 2,203 km.

2. *Stations and Halting-places.*

In 1911	Stations	122
	Halts	72
	Total	194
In 1920	Stations	175
	Halts	94
	Total	269

3. *Rolling-stock.*—The State was in possession of the following rolling-stock :

	In 1911	In 1920
(*a*) Locomotives	196	240
(*b*) Passenger coaches, heating vans, mail vans, guards vans, etc.	164	159
Goods wagons (covered)	2,677	1,631
Goods wagons (open)	1,809	1,500
Total wagons	4,920	3,512

4. *Present condition of Track, Rolling-stock, Repairs, etc.*—The rolling-stock has greatly diminished since the recent wars ; the deficiency has now been considerably augmented by the return to Serbia of such of her rolling-stock as had been held as war booty. This shortage naturally had a marked effect on the running of trains, the number of which was reduced to a minimum. As a result of the impossibility of proper supervision and upkeep during the wars, which have continued almost incessantly since 1912, the track and rolling-stock are in a deplorable condition. Owing to financial difficulties, and to the impossibility of obtaining the necessary materials, adequate measures for the supply of the needs of the maintenance, locomotive and traffic departments could not be taken immediately after the conclusion of the wars. In addition, the general strike of the personnel of the Bulgarian railways and ports which occurred in January and February 1920, added to the difficulties of the situation. Work on the most needed and urgent improvements is, however, being carried on uninterruptedly. The supply of wooden sleepers has been increased, and the repair of rolling-stock in the workshops of the State railways already shows some, though, as yet, inconsiderable, progress.

The average speed of trains is 30 km. per hour. The construction of new lines is not at present under consideration, with the exception of a few narrow-gauge lines of purely local importance, and of the normal-gauge line Mezdra-Vidine, which has now been completed and is in operation as far as Alexandrovo. The remaining portion, of about 30 km. (terminating at the port of Widdin on the Danube), the construction of which had been delayed during the wars, is expected to be completed very shortly.

5. *Distance covered by Rolling-stock.*	1911	1919/20
Note.—For the year 1919/20 the period considered corresponds to the financial year.		
(a) Locomotives : Total effective distance, km.	6,002,274	4,866,239
(b) Wagons : Passenger coaches, axle km.	53,338,104	42,647,013
Vans, axle km.	12,913,911	11,746,296
Mail vans, axle km.	7,221,833	5,979,074
Goods trucks, axle km.	90,696,732	108,291,305
Total	164,170,580	168,663,688

6. *Train circulation.*	1911	1919/20
Number of trains :		
Passenger	11,217	5,021
Mixed	9.324	16,066
Goods	17,758	18,417
Official	1,379	1,741
Total	39,678	41,245

Distance covered by trains in train km.:		
Passenger	2,471,953	1,000,853
Mixed	997,532	1,405,536
Goods	1,946,183	1,849,966
Total	5,415,668	4,256,355

Remarks.—The distance covered by the international trains (Orient Express, and Simplon Orient Express) is included in the above figures. For the year 1911 the figures for these trains are as follows:

Number of trains	394
Train kilometres	141,840
Axle kilometres	2,927,985

For the year 1919-1920 these figures cannot yet be supplied separately.

7. *Passenger, Goods and Parcel Post Traffic.*

	1911	1919/20
(a) Passengers:		
Number of persons carried	3,485,811	4,996,750
Distance in passenger km.	234,094,958	299,751,679
(b) Goods by fast and slow trains:		
Quantity carried, in tons	3,037,448	934,577
Distance covered by these quantities, ton km.	270,358,371	202,087,805
(c) Parcel and postal services:		
Quantities carried, tons	10,402	12,172
Distances covered by these quantities, ton km.	1,198,156	2,191,150

8. *Traffic Receipts.*

(a) Passengers:	levas	11,406,301	67,957,731
Goods	,,	15,651,565	68,874,691
Luggage and parcel post	,,	458,168	5,609,292
Total		27,516,034	142,441,714
(b) Other receipts	levas	158,564	339,936
Total receipts		27,674,598	142,781,650

9. *Working Expenses.*

Excess, coefficient of operations, etc.			approximately
Expenditure	levas	17,427,039	200,000,000
Excess	,,	10,247,558	
Coefficient of operations		62.97	
Income from excess over initial capital		3.56	

10. *Increase in Tariff Charges.*—These charges, both as regards passenger and goods traffic, have been increased by about 400 % as compared with those obtaining in 1915. A scheme for tariffs, which would provide more fully for present needs, is at present under consideration. In any event a fresh rise in tariff charges is expected.

11. *Fuel.*—During the financial year 1919/1920 the total consumption of coal by the railways amounted to 332,736 tons, making 0.192 kilogrammes per kilometric ton. The coal is obtained from the State mine at Pernik. The cost per ton varies according to quantity from 80-100 levas, but since January 1921 it has stood at 100-120 levas.

II.

PORTS.

(a) *Black Sea Ports.*

In 1911 the following ports existed on the Black Sea coast of Bulgaria: Kovarna, Balchik, Varna, Messemvria, Anhialo, Burgas and Sozopoll.

In 1920 on the same coast line the Bulgarian ports were as follows: Varna, Messemvria, Anhialo, Burgas, Sozopol, Vassiliko and Ahtopol.

Since the Balkan War of 1912-1913, and the world war of 1915-1918, Bulgaria has lost two important ports, Baltchik and Kovarna, both important as corn-exporting centres; whereas after the Balkan War she gained only two small ports of local importance, Vassiliko and Ahtopol.

1. *The Port of Varna*, which was constructed during the years 1895 to 1905, is enclosed by piers and sea walls and has a well-sheltered harbour of 30 hectares. The length of quay available for big ships is 700 metres; and for sailing-ships of the coastal service, 123 metres. The depth of the harbour when dredged is from 7 to 8 metres at low water, the average tides not exceeding 35 cm. The eastern portion of the harbour is deeper, reaching to 9.5 metres near the sides of the quay. Two sheds, having a total surface of 4,200 square metres, have been erected on the platform, as well as railway lines, etc. Another shed is being built. The port is supplied with floating cranes for discharging goods of great weight; one of these cranes has a capacity of 40, and the other of 10 tons.

Traffic in the Port of Varna	1921	1920
Incoming vessels, number	1,923	728
Tonnage in registered tons	1,046,327	529,040
Goods unloaded, kilogrammes	164,518,840	70,060,000
Goods loaded, kilogrammes	302,383,689	27,010,000
Total	466,902,529	97,070,000
Total passengers	52,225	20,227

2. *The Port of Burgas.*—This port, which is completely sheltered by piers and sea walls, possesses a dredged harbour with a depth of 7 m. 80 at low water and an area of about 30 hectares. The average depth of tides is 35 cm. The total length of quay available for ships of heavy tonnage is 595 metres. There is also a small quay with a length of 130 metres for sailing ships engaged in local coastal trade. There are two sheds with a total surface of 4,800 square metres on the platform, and a third is under construction. The port is equipped with railways.

Traffic in the Port of Burgas	1911	1920
Incoming vessels, number	2,164	736
Tonnage in registered tons	795,659	318,731
Goods, unloaded, kilogrammes	143,113,499	34,300,000
Goods, loaded, kilogrammes	246,145,209	27,300,000
Total	389,288,709	61,600,000
Total passengers	29,059	6,199

Total figures showing Traffic in the Bulgarian Black Sea Ports for the year 1911.

Incoming vessels, number	6,456
Tonnage in registered tons	2,163,667
Goods unloaded in tons	321,875
Goods loaded in tons	652,554
Total	974,429
Total passengers	153,379

b) *Danube Ports.*

In 1911 Bulgaria possessed the following ports on the Danube, which forms the frontier between Roumania and Bulgaria :— Silistria, Tutrakan Russe (Rustschuk), Svistov, Nikopol, Somovit, Rahovo, Lom and Widdin.

In 1920, after the Balkan War and the world war, the number of Bulgarian ports on the Danube was reduced by the cession of Silistria and Tutrakan to Roumania. Of the above ports the following have direct communication with the internal railway system of the country : Russe, Svistov, Somovit, and Lom. The port of Widin will also be connected with the railway system in the near future.

Only a few of these ports are furnished with special equipment, either complete or in course of construction. These ports are Russe, Svistov, Lom and Widin.

Traffic in the Danube Ports during the year 1911.

Incoming vessels[1], number	12,362
Tonnage in registered tons	2,787,785

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[1] Vessels include steamships, sailing vessels and barges.

Goods, unloaded, in tons	237,369
» loaded, in tons	431,896
Total	669,265
Total passengers	364,653

The tonnage, in registered tons, of incoming vessels in certain Danubian ports in 1911 was as follows :—

Russe	527,900	Rahova	294,400
Somovit	289,000	Silistria	288,000
Svistov	287,000	Tutrakan	266,700
Widin	255,300	Lom	252,000
Nikopol	227,000		

Traffic in the Port of Russe (Rustchuk).

	1911	**1920**
Incoming vessels, number	2,162	1,010
Tonnage in registered tons	527,867	124,570
Goods, unloaded, tons	70,058	36,023
» loaded, tons	66,858	26,370
Total	136,916	62,393
Total passengers	70,272	13,388

c) *Improvements undertaken.*

The ports of Varna and Burgas were already too small for the handling of vessels and their cargoes ; plans were therefore drawn up for the enlargement of these two ports. Works for the enlargement of the port of Varna are in process of execution, but were suspended during the recent wars. The following figures will show the extent to which the wharves of the port of Varna have been utilised :—

Goods per metre of wharf	in 1911	645 tons
	» 1920	140 »
Registered tonnage of incoming vessels per metre of wharf	» 1911	1.405 r. t.
	» 1920	767 r. t.
Goods unloaded per registered ton of incoming vessels	» 1911	0.434 tons
	» 1920	0.183 »

It is proposed to prolong the wharf along the shore for 144 metres, and to construct a mole with 710 metres of quay wall. The extent to which the port of Varna will be enlarged in the future will depend on the site which is decided on for the granaries, the construction of which is also contemplated.

Similar works are proposed at the port of Burgas.

As regards the Danubian ports of Bulgaria, we are at present engaged in completing the work commenced before and during the Balkan War and the world war in order to provide the installations which are of primary necessity, particularly at Russe, Sovisto and Lom.

The loading and unloading of goods in our sea-ports is carried out by manual labour, owing to the lack of cranes and special machinery ; it is also proposed to install semi-portable *(semi-portales)* cranes on the quays. The carrying out of all these schemes will depend on the financial resources of the State.

(d) *Condition of the Mercantile Marine.*

The data given below only refer to vessels of upwards of 5 tons. The Bulgarian mercantile marine in the Black Sea and the Danube includes.

	In 1911		In 1920	
	Number	Tonnage, in gross r. t.	Number	Tonnage, in gross r. t.
Sailing vessels	120	4,956	169	6,581
Steamships	16	11,617	20	10,867
Total vessels . .	135	1,6573	189	17,448

The majority of these steamships belong to the Bulgarian Commercial Steam Navigation Company at Varna, *viz :* 6 steamships with a gross tonnage of 6,553 r. t. and net tonnage of 3,968 r. t.

Fuel for Navigation.—Before the world war the fuel used was coal obtained from Cardiff, Westphalia and Zonguldak (Turkey).

At present the only coal used is that obtained from the State mine at Pernik.

III.

MOTOR TRANSPORT.

Motor services organised as motor transportation companies are little developed in Bulgaria.

IV.

AIR TRANSPORT.

There is no air transport in Bulgaria. The creation of a service of this kind is under consideration.

CANADA.

I

RAILWAYS.

The railways of Canada are - with very few exceptions of very short mileage - constructed on the standard gauge of 4 ft. 8 ½ in., so that all rolling stock is interchangeable one line with another and with the railways of the United States.

* * *

Whilst in 1914 there was only one completed transcontinental line, namely, the Canadian Pacific Railway, two other transcontinental lines were under construction - the Canadian Northern and the combined Grand Trunk Pacific and National Transcontinental railways.

At the present time the Canadian Pacific remains undisturbed, whilst the other lines mentioned have been combined and now form Canadian National transcontinental system.

In addition to the main trunk lines there are various feeders, some belonging to the above-mentioned railways and some owned by other railway corporations. The total mileage in 1914 was 30,795 (of which 2,293 was double track). The total mileage in 1919 was 38,896 (of which 2,543 was double track).

Of the mileage shown in 1914, the present Canadian National Railway and the Grand Trunk Railway systems accounted for 12,622 miles, whereas the Canadian Pacific and leased lines accounted for 11,950 miles—the balance, 6,223 miles, belonging to smaller corporations scattered all over Canada, nearly all, however, having physical connection with one of the trunk lines.

Of the total mileage in 1919, the Canadian National and Grand Trunk Railway systems accounted for 19,510 miles, and the Canadian Pacific and leased lines for 13,295—the balance, 6,091 miles, belonging to various smaller corporations.

Rolling-stock.

Locomotives.	1914	1919
Passenger	1,783	1,457
Freight	3,028	3,610
Switching	636	812
Totals	5,447	5,879

Passenger Cars.	1914	1919
First class	2,167	2,172
Second class	627	618
Combination	491	396
Emigrant	466	701
Dining	204	203
Parlour	130	164
Sleeping	500	550
Baggage, express and postal	1,378	1,513
Other	39	195
Totals	6,002	6,512

Freight Cars.

	1914		1919	
	No.	Capacity	No.	Capacity
Box	146,507	4,846,425	153,520	5,255,121
Flat	26,151	814,440	24,768	817,847
Stock	7,589	221,965	9,189	272,590
Coal	15,955	630,435	18,375	772,800
Tank	496	15,625	419	14,340
Refrigerator	4,716	139,190	6,022	180,800
Other	2,676	104,830	4,965	185,797
Totals	204,190	6,772,910	217,258	7,499,295

Thus for every 1,000 miles of line there were :—

	1914	1919
Locomotives	176	150
Freight cars	6,636	5,585
Passenger cars	195	167

and all are operated with automatic couplers and train brakes.

In 1914 the average capacity of all cars was 33.2 tons; the average capacity of a box car was 33.1 tons. In 1919 the average capacity of all cars was 33.6 tons; the average capacity of a box car was 34.3 tons.

The employment of heavier units is well demonstrated in the fact that between 1914 and 1919 there is an increase of 1.2 tons in the average capacity of box cars.

II

INLAND NAVIGATION.

By Article XXVI of the Treaty of Washington (1871), the navigation of the river St. Lawrence, ascending and descending from the 45th parallel of north latitude, where it ceases to form the boundary between the two countries, from, to, and into the sea, shall forever remain free and open for the purposes of commerce to the citizens of the United States, subject to any laws and regulations of Great Britain or of the Dominion of Canada, not inconsistent with such privilege of free navigation.

By Article XXVII, the Government of Great Britain, after a consultation with the Government of Canada, agreed to grant the citizens of the United States the use of the Welland, St. Lawrence and other canals in the Dominion, and the Government of the United States granted to the subjects of Great Britain the use of the St. Clair Flats Canal on terms of equality with the inhabitants of the United States and engaged to urge upon the various State Governments the granting of the free use of several State canals connected with the navigation of the lakes or rivers traversed by, or contiguous to, the boundary line on terms of equality with the inhabitants of the United States.

The right of British subjects to the free navigation of Lake Michigan was granted by the same Treaty for a short term of years which expired but was renewed in perpetuity by the Waterways Treaty of 1911 (1).

In the same way all vessels of all flags having cargoes for interior ports in Canada or the United States, or proceeding to procure cargoes, may use the canals on the same terms as vessels of Great Britain or the United States.

Vessels of only those countries that accord coasting privileges to British vessels are allowed to engage in any coasting trade in Canada, that is to say that *petit cabotage* is permitted to a limited degree only.

The canals of Canada may be divided into two systems, which may be called the main line for heavy traffic and the various subsidiary canals.

The main canal system embraces the St. Lawrence River, Lake Ontario, Welland Canal (to overcome Niagara Falls), Lake Erie, Detroit River, Lake St. Clair, St. Clair River, Lake Huron, and St. Mary's River with its canal (to overcome the Long Sault rapids), and Lake Superior.

The St. Lawrence River, from the gulf to Montreal, a distance of 400 miles, has been rendered navigable for vessels drawing 30 ft. of water by dredging through 82 miles of shoaler water. At Montreal, rapids begin and extend almost to Prescott, a distance of 112 miles. These are passed by the operation of 24 locks, 270 ft. long, 45 ft. wide with a depth on the sill of 14 ft., overcoming a rise of approximately 210 ft. Vessels using these canals are able to carry 90,000 bushels of grain, approximately 2,700 tons.

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(1) See Annex, page 162.

From Prescott to Port Dalhousie (the north or lower entrance to the Welland Canal) vessels navigate first the wide and deep St. Lawrence River for a distance of 98 miles and then emerge into Lake Ontario, which is 130 miles long between Kingston and Port Dalhousie.

At Port Dalhousie, vessels enter the Welland canal, 27 miles long, which has been constructed through the Niagara peninsula to overcome the drop of 327 ft. between lakes Erie and Ontario (Niagara Falls). The locks, 26 in number, are 45 ft. wide, 270 ft. long with 14 ft. on the sills and through the "dredged outs".

In connection with an improvement and the possibility of carrying ocean-going vessels to the head of lake Superior, the Government of Canada has undertaken the construction of a new Welland canal by enlarging part of the present one and constructing another practically paralleling the old one. The new canal will be 25 miles long with 7 lift locks, each with a raise of 46 ½, ft., 800 ft. long, 30 ft. wide and 30 ft. over the sills at extreme low water. This canal will not be in operation for two or three years.

Upon emerging from the Welland canal at Port Colborne, vessels enter lake Erie and run through it to the south end of Detroit river, a distance of 216 miles. Detroit river is 31 miles long, the channel of which has been slightly improved to a depth of 20 ft.

Upon emerging from Detroit river vessels enter and cross lake St. Clair, a distance of 19 miles, the channel having required slight improvement to make it 20 ft. deep.

River St. Clair is entered through St. Clair flats canal, a cutting made by the United States Government through the sand-bar at the south end of the St. Clair river. This canal is duplicate, one for north-bound and the other for south-bound boats. It has ample depth and width for the largest lake carriers. River St. Clair is 44 miles long and has ample water for the largest lake vessels.

Entrance to lake Huron, from river St. Clair, is by another cutting through the sand-bar at the foot of the lake where sufficient depth and width has been secured for the heavy traffic in this region.

Lake Huron between the head waters of St. Clair river and the foot of St. Mary river, is 223 miles long.

St. Mary river connects lake Huron with lake Superior and is 63 miles long. A minimum depth of 20 ft. has been secured through this river by dredging through various shallow places and building locks to overcome the rapids at Saulte Ste. Marie, where the fall is 19 ft. The canal is about one mile long, it has one lock 90 ft. long, 60 ft. wide and has about 20 ft. of water on the sill.

Vessels, if they so desire, may use any one of the four locks on the American side of the river, the largest two of which are 252 ft. long, 80 ft. wide with a least depth of 24 ½ ft. on the sill.

On emerging from St. Mary river, vessels enter lake Superior, and after a voyage of 250 miles reach Port Arthur or Fort William at the Canadian head of the lake.

Subsidiary Canals.

Ottawa River Canals.—These canals connect lake St. Louis on the St. Lawrence with the city of Ottawa. Combined, they are 96 miles long and have eight locks of a minimum size of 200 ft. long, 45 ft. wide, with a depth of 9 ft. over the sill. The total lockage is 63 ft.

Rideau and Cataraqui Rivers.—These rivers connect the Ottawa river, at Ottawa, with the St. Lawrence river, at Kingston. The canal is 126 miles long, has 33 locks ascending from Ottawa to the submit level and 14 descending. The total lockage is 457 ft. (that is to say, 292 ascending and 165 descending). The minimum size of the locks is 134 ft. long, 33 ft. wide, with 5 ft. over the sills.

There is a small tributary canal connecting Rideau lake with the town of Perth, a distance of 7 miles. In it are two locks making a total rise of 26 ft., 134 ft. long, 33 ft. wide and with 5 ½ ft. of water over the sills.

Richelieu River.—This river has been improved to permit of navigation between the St. Lawrence river, at Sorel, and lake Champlain, at the boundary line. It is 81 miles long, has 10 locks giving a rise of 79 ft. with a minimum depth of 6 ½ ft. on the sills, the smallest lock being 22 ½ ft. wide, 118 ft. long.

Trent Canal.—This canal connects the bay of Quinte, in lake Ontario, with Matchedash bay in Georgian bay (lake Huron). The canal is not quite completed. It will be about 275 miles long, have 41 locks in it, the minimum size being 33 ft. wide and 134 ft. long with a minimum depth of 6 ft. on the sills. Whilst this canal is not yet open for through traffic much, of it is open for local.

There are various small canals throughout the country that connect waters of the same level, that is to say, cutting through a narrow isthmus to avoid long detours. One of these is in lake Ontario, called the Murray canal; it is 5 miles long, 80 ft. wide, 11 ft. deep and has no locks. Another is the St. Peter's canal in Cape Breton island; it is ½ mile long, 55 ft. wide, has one tidal lock 48 ft. wide, 300 ft. long with 18 ft. depth in it. It connects St. Peter's bay on the southern side of Cape Breton with Bras D'Or lakes, and crosses the isthmus ½ mile in width giving access from the Atlantic to the lakes.

In the main system the Soulanges canal supersedes the old Beauharnois canal, which is now being used for power purposes and is no longer available for navigation.

Ottawa & Georgian Bay Ship Canal.—A survey and estimate has been made for the construction of a ship canal to extend from Montreal to Georgian bay *via* the Ottawa river, Mattawa river, lake Nipissing and French river, but work on this has not been started. Large sections of the Ottawa river and lake Nipissing can be navigated at the present time, but owing to the lack of locks vessels cannot get from one reach to another.

In addition to the canal systems in Canada, many rivers and lakes are navigable, but only for short distances; for example, the Saguenay river from St. Lawrence north to lake St. John, a distance of 110 miles. All the other rivers emptying into the St. Lawrence river are for shallow-draft boats only, and on them is very little navigation. In the western prairies there are the Saskatchewan, Nelson and Red rivers, draining into Hudson bay, and all navigable for small boats. The great Mackenzie river is open for a few months every year and vessels can proceed for many miles north to the Arctic Ocean. In British Columbia there are many lakes and rivers on which numerous vessels ply, particularly in those districts where, owing to the configuration of the country, railways have not been built, but none of these routes is of any great length. They are the Columbia, Kootenay, Fraser, Skeena, Thompson and a few others.

III

MERCANTILE MARINE.

Position with regard to transport.

The Canadian Merchant Marine, as a factor in the transport of passengers and freight in Canada, may be divided into five districts which at the present time are operated with very little overlapping or intercommunication, namely :—

Traffic on the Atlantic coast.
Traffic on the Great Lakes.
Traffic between the lakes and the sea.
Traffic on the Pacific coast.
Traffic on the inland waters scattered throughout the country.

Those vessels trading on the Atlantic seldom go beyond. Those on the Great Lakes are generally confined to fresh water either because they are too large to pass through the Welland and St. Lawrence canals or their engines are not equipped for use on salt water. There are a few boats whose size permits them operating through the canals and whose engines are equipped for use both on salt or fresh water.

Vessels on the Pacific Ocean for the most part trade there without having much intercourse with the east, and those on the inland waters are confined to small districts out of which they cannot pass.

The following tables show the sizes and numbers of vessels in the two years 1914 and 1920 in these various districts :—

	Gross Tonnage.	
	1914	1920
Atlantic	123,674	284,361
Great Lakes	315,417	367,742
Lakes and Sea	70,395	68,665
Pacific	86,363	138,520
Minor	53,920	51,366
Totals...	649,769	910,654

Tonnage	Atlantic		Great Lakes		Lakes & Sea		Pacific		Minor		Totals	
	1914	1920	1914	1920	1914	1920	1914	1920	1914	1920	1914	1920
100 to 1,000	109	112	241	233	68	78	112	103	165	144	695	670
1,000 to 2,000	14	23	55	59	18	20	10	24	1	7	98	133
2,000 to 3,000	7	24	19	26	5	7	4	1			35	58
3,000 to 4,000	3	12	12	13			1	4			16	29
4,000 to 5,000		4	2	4			4	3			6	11
5,000 to 6,000		8	2	4				3			2	15
6,000 to 7,000			3	4				1			3	5
7,000 to 8 000		1	2	2							2	3
8,000 to 9,000			1	1							1	1
9,000 to 10,000		1										1
10,000 to 11,000		1										1
11,000 to 12,000	2										2	
16,000 to 17,000								2				2
TOTALS...	135	186	337	346	91	105	131	141	166	151	860	929

Annex to Chapter II.

(Inland Navigation.)

International Joint Commission.

In 1911 the Governments of Great Britain and the United States entered into a treaty "for the purpose of preventing disputes regarding the use of boundary waters (between the two countries) and to settle all questions now pending between the United States and the Dominion of Canada involving the rights, obligations or interests of either in relation to the other or to the inhabitants of the other, along their common frontier and to make provision for the adjustment and settlement of all such questions as may hereafter arise."

The Treaty is composed of 14 articles with a protocol and a preliminary article. It enters minutely into the method of procedure to be adopted with regard to the investigation of various disputes that may arise.

For the purpose of carrying out the treaty, an International Joint Commission has been appointed composed of three members from the United States and three members from Canada.

The preliminary article defines boundary waters.

Article I is an agreement that the navigation on all navigable boundary waters shall for ever continue free and open to the inhabitants of both countries, and the waters of Lake Michigan are opened to citizens of Great Britain on an equality with those of the United States. Either country may adopt rules and regulations governing the use of canals within its own territory and may charge tolls for the use thereof, but all such rules and regulations and all tolls charged shall apply equally to both countries.

Article II.—Each country reserves to itself the exclusive jurisdiction and control over the use and diversion of all waters on its own side of the line, but should any interference with or diversion from the natural channel of such waters result in any injury on the other side, the citizens of each country may go into the courts of the other country and claim damages.

Article III.—Each country agrees that there shall be no further uses or obstructions or diversions of the boundary waters on either side of the boundary line except by authority of the aforesaid International Joint Commission.

Article IV.—Each of the contracting parties agrees not to place any works in streams crossing the boundary line at a lower level than the boundary line, the effect of which might be to raise the natural level on the other side of the boundary line, unless these works are approved by the International Joint Commission. In the same article both countries agree not to pollute any of the boundary waters.

Article V limits the amount of the diversion at Niagara Falls for power purposes by each country.

Article VI refers to a diversion of water in the St. Mary and Milk rivers (on the eastern slope of the Rocky mountains) for irrigation purposes.

Article IX. —It is agreed that the International Joint Commission may be called upon by either or both countries to investigate and report and make recommendations on any questions arising along the common frontier between the United States and the Dominion of Canada.

Article X.—It is agreed that the Commission may be called upon to investigate and report on any question of disagreement that may arise between the two countries. If in this case the Commission is equally divided, the matter may be referred to an umpire to be chosen in accordance with the Hague Convention and this umpire shall have power to render a final decision.

Articles XI and XII refer to the working of the Commission.

Article XIII defines special agreements.

Article XIV relates to the ratification of the Treaty.

The protocol relates to the division of water in St. Mary's Rapids in St. Mary's River.

The Commission met for organization on January 12, 1912, and has settled many disputes since to the satisfaction of the citizens of both countries. It has also reported on various problems relating to the use of the boundary waters in a manner it is safe to say, that could not have been performed otherwise. The Commission is highly respected on both sides of the boundary line, and it is felt throughout the continent that its creation was a decided advance in international intercourse.

CHILE.

I.

INTERNATIONAL CONVENTIONS.

On October 17, 1887, Chile concluded with the Argentine Republic a Convention regarding the railway service across the Andes, and on August 16, 1912, another Convention with Bolivia regarding transit and communications.

No difficulty has arisen in the application of these Conventions, and it is under their auspices, under a system of perfect freedom, that commerce is developing between the peoples of the extreme south of the American continent.

The Chilian Government desires to maintain these two Conventions in full force.

II.

RAILWAYS.

Chile, which possesses a greater number of international railways than any other American State, has constructed at her own expense the railway which unites the Port of Arica with La Paz, the capital of Bolivia.

Chilian capital has also been employed on the construction of the railway which, starting from Antofagasta, traverses the whole southern part of Bolivia and goes as far as La Paz. There is also the railway which connects the town of Santiago and the port of Valparaiso with the Argentine Republic. The Trans-Andan railways, running *via* Antuce and *via* San Martin, are also in course of construction. Several other routes of communication with the Argentine Republic are under consideration.

The national railways include, in the first place, the longitudinal railway which traverses the territory of the Republic from north to south, and which is operated from the port of Iquique, in the northern zone, as far as Puerto-Monte on Lake Llanquihue in the southern zone.

This line is connected by various branches with the coast ports and the Cordillera.

A new longitudinal line is now constructed which traverses the valleys of the coastal Cordillera.

There are numerous private railways—especially in the northern zone—used for the transportation of saltpetre and of the mineral wealth of this region.

The statistics of the year 1918 show that Chile possesses a total of 9,000 kilometres of railway, of which 5,000 belong to the State and 4,000 to private companies.

The Government has also in course of construction, or under consideration, about 10,000 kilometres of railway, which are intended to complete the railway system of the Republic.

The capital invested by the State in railways amounts to 500,000,000 gold francs, and the capital invested in private companies to 200,000,000, making a grand total of 700,000,000.

The receipts of the State railways amounted in 1918 to 76,000,000 gold francs, and those of private railways to 47,000,000, making a grand total of 123,000,000 gold francs. The traffic statistics showed 27,000,000 passengers and 16,000,000 tons of goods carried.

The Government has just obtained a loan of 25,000,000 dollars from the United States in order to purchase plant and to extend the railway service. It proposes to contract a new loan of 12,000,000 dollars, to be spent on new constructions.

The local or urban railways in Chile have a length of 500 kilometres, and represent a capital of 55,000,000 gold francs.

Haulage is, generally speaking, carried out by means of coal obtained from the mines of the country.

III.

MARITIME NAVIGATION.

The Chilian Government has completed works for the improvement of the ports of Talcahuano and San Antonio, and the works on the port of Valparaiso will be completed very shortly. A comprehensive scheme of harbour works for the whole country is under consideration. This scheme was submitted to the National Congress by M. Rivas-Vicuna when Finance Minister. The works at the port of Antafagasta, intended to facilitate the export of saltpetre and the trade with Bolivia, are already being carried out. Under the same scheme there are plans for improving the ports of Arica and Iquique in the northern zone; of Constitucion and Llico in the central zone; of Levu in the coal district; and of Puerto-Saavedra and of Valdivia in the southern district.

In 1918 (excluding small craft) 6,000 vessels with a tonnage of more than 15,000,000 tons entered or left the ports of the Republic.

Maritime commerce suffered considerably during the European War owing to lack of vessels and as a result of difficulties in respect of the fuel supply, but the situation is rapidly becoming normal.

IV.

OTHER MEANS OF TRANSPORT.

A few years ago motor transport services were started. They were interrupted owing to the war, but are now being actively resumed in the central part of the country.

Air navigation has not yet been established as a system of transport, but the postal service makes use of it in some places, and this enables tests to be carried out with a view to a wider organisation of the service.

In the southern part of the country, the rivers are utilised in connection with the exploitation of forests, to carry the timber as far as the ports, where it is shipped for exportation.

CHINA.

I.

RAILWAYS.

(Financial Year 1918.)

TABLES.

I. — Lines in operation.
II. — Lines under construction.
III. — Lines authorised and lines planned.

Chinese State Railways.

IV. — Locomotives.
V. — Rolling stock (passenger).
VI. — Rolling stock (goods).
VII. — Amount of capital.
VIII. — Total number of kilometres covered by the trains.
IX. — Number of passengers.
X. — Tons of merchandise.
XI. — Consumption of fuel.
XII. — Receipts.
XIII. — Expenditure.
XIV. — Expenditure per kilometre; Coefficient of operation.

TABLE I.

Lines in Operation.

A. *Chinese State.*

Lines (including branch-lines).	Kilometres.
1. Peking-Hankow	1,314
2. Peking-Mukden	975
3. Tientsin-Pukow	1,107
4. Shanghai-Nanking	328
5. Shanghai-Hanchow-Ningpo	287
6. Peking-Suiyuan	495
7. Cheng-Tai	245
8. Taokow-Shinghua	153
9. Kaifeng-Honan	185
10. Kirin-Changchun	130
11. Chuchow-Pinschsiang	91
12. Canton-Kowloon	144
13. Canton-Samshui	49
14. Changchow-Amoy	28
	Total.. 5,529

B. *Lines under Construction* *by the Chinese State, and in partial Operation.*

Lines.	Kilometres in partial operation.
15. Lung-Hai	277
16. Hupeh-Hunan	476
17. Ssu-Tsen	88
	Total.. 841

C. *Provincial and Private Lines.*

Lines.	Kilometres.
18. Kwangtung	225
19. Kinkiang-Nanchang	129
20. Sunning	109
21. Swatow-Chaochowfu	42
22. Town of Nanking	11
23. Chinh-Hsing Mines	43
24. Tayeh Mines	30
25. Ching-Esing Mines	15
26. Kailan Mines	16
27. Taiyaokow Mines	34
28. Town of Tsitsikar	29
	Total.. 683

D. *Lines Authorised.*

Lines.	Kilometres in operation.
29. Chinese Eastern	1,722
30. South-Manchurian	1,750
31. Shantung	493
32. Yunnan	465
33. Canton-Kowloon (British Section on the Hong-Kong territory)	35
	Total.. 3,865

Summary of Lines in Operation.

A.	5,529	kilometres.
B.	841	,,
C.	683	,,
D.	3,865	,,
Total.....	10,978	kilometres.

TABLE II.

Lines under Construction.

	Names of lines	Kilometres
40	Szepingkai-Chengkiatung	84
41	Kaiyuan-Hailungcheng	176
42	Fengchen-Paotowchen	351
	Lung-Hai.	
43	Lanchow-Sian	660
	Lan-Tungkuanting	136
	Tungkuanting-Mienshe uchow-	162
	Tsinkiangpu	192
	Teinkiangpu-Haighow	112
44	Chungking-Hubichow Hueichow-Ichang Ichang-Hankow	922
45	Siuchow-Hengchow Hengchow-Chuchow	434
46	Hengchow-Pokuan	112
47	Ceinture de Canton	16
48	Wuhu-Ningkuo Ningkuo-Kuangte	110
	Total...	3,467

TABLE III.

Lines Authorised (c) and Lines Planned.

		Names of lines	Kilometres
		(A) *Manchuria and Mongolia.*	
c)	50	Kirin-Hunchen	384
	51	Ninguta-Mulin	80
c)	52	Kungchuling-Ytungchow	260
		Hailungchen-Kirin	
	53	Harbin-Shuhui	240
c)	54	Harbin-Mergen Mergen-Aigun Aigun-Blagoveshchensk	736
c)	55	Mergen-Tsitsikar	320
c)	56	Khiakta-Urga	320
c)	57	Suiyuan-Khiakta	1,200
c)		Jehol-Chefeng	225
c)	58	Chefeng-Chingchow	305
c)		Chefeng-Taonan	600
		Taonan-Khailar	580
c)		Taonan-Changchun	260
c)		Taonan-Chenghiatung	250
		(B) *North of the Yang-Tze-Kiang.*	
c)	59	Tantung-Taiyuan Taiyuan-Tungkuan Tuan-Kuan-Sian Sian-Hanchung Hanchung-Chengtu	1,540
		Carried forward...	7,300

TABLE III *(continued)*.

Lines Authorised (c) and Lines Planned.

		Name of lines.	Kilometres.
		Brought forward	7.300
c)	60	Pekin-Jehol	210
		Kalgan-Dolonor	305
		Dolonor-Chefeng	200
c)	61	Ily-Lanchon	2,050
c)	62	Chengting-Techow	175
c)	63	Sinyang-Pukow	430
	64	Siangyang-Shasi	330
		Siangyang-Kuangshui	210
c)	65	Chowkiakow-Yencheng	90
		Yengcheng-Siangyang	290
		Siangyang-Hanchung	640
c)	66	Chingtu-Chungking	280
	67	Chefu-Weihkien	270
c)	68	Kaomi-Yhsien	320
	69	Tsining-Kaifenb	345
	70	Ycheng-Tsinkiangpu	95
c)	71	Tsinan-Shuntefu	260
	72	Tsinan-Taokow	290
	(C)	*Lines South of the Yang-Tze-Kiang.*	
c)	73	Shasi-Hsingy	1.050
		Changtefu-Changsh	170
	74	Kuelin-Chenchow	290
	75	Canton-Wuchow	880
		Wuchow-Nanning	
		Nanning-Lungchow	
		Lungchow-Nankuan	
		Carried furward	15,770

TABLE III *(continued)*.

Lines Authorised (c) and Lines Planned.

		Names of lines.	Kilometres.
		Brought forward......	15,770
c)	76	Yunnanpu-Chungking..... Yunnanfu-Yamchow...... Suifu-Chengpu...........	1,920
c)	77	Shanghai-Pinghsiang........	1,600
	78	Yunnanfu-Tangyue-et-Bhamo	800
	79	Canton-Macao.............	90
	80	Chachow-Skelun...........	320
	81	Sunning-Yeungkong........	110
	82	Shekwan-Changchow........	600
	83	Nanchang-Fuchow.........	500
	84	Hangchow-Wenchow........	400
		Total..	22,810

General Summary.

Lines in operation................	10,918	kilometres.
,, under construction...........	3,572	,,
,, authorised..................	15,705	,,
,, planned.....................	7,105	,,

TABLE IV.
Locomotives.
(Chinese State Railways,)

Lines	Passenger Locomotives			Goods Locomotives			Shunting Locomotives			Total of Locomotives
	Number	Traction power in metric tons		Number	Traction power in metric tons		Number	Traction power in metric tons		
		Total	Average per engine		Total	Average per engine		Total	Average per engine	
Peking-Hankow	47	420,204	8,941	67	733,846	10,953	25	130,820	5,233	139
Peking-Mukden	18	141,406	7,861	109	1,015,699	9,318	27	202,232	7,494	154
Tientsin-Pukow	38	402,490	10,592	38	415,996	10,947	18	150,108	8,339	94
Shanghai-Nanking	23	172,797	6,513	10	102,536	10,254	4	33,387	8,347	37
Shanghai-Hanchow-Ningpo	12	91,191	7,599	12	147,198	12,266	12	88,553	7,379	36
Peking-Suiyuan	29	414,152	14,281	26	424,212	16,316	15	106,884	7,126	70
Chengtai	6	35,040	5,840	38	218,120	5,840	13	46,325	3,563	57
Taokow-Chinhua	1	8,349	8,349	6	59,949	9,991	3	19,856	6,618	10
Kaifeng-Honan........	5	49,000	9,800	5	49,000	9,800	5	22,140	4,428	15
Kirin-Changchun	4	35,649	8,912	6	53,472	8,912	3	20,093	6,698	13
Chuchow-Pinghstang ...	7	60,611	8,658	3	19,956	6,652	2	11,335	5,677	12
Canton-Kowloon.......	12	112,677	9,389	—	—	—	2	3,686	1,843	14
Changchow-Amoy......	2	10,793	5,396	—	—	—	—	—	—	2
Total in 1918	204	1,954,444	9,581	320	3,239,984	10,125	129	835,519	6,476	653

1918, total of locomotives... 653 total traction power... 6,029,947 mt. aveqage per engine... 9,234 mt.

1915, total of locomotives... 629 total traction power... 5,618,641 mt. average per engine... 8,932 mt.

TABLE V.

Rolling stock (Passenger).

(Chinese State Railways.)

Lines	1st Cl.	2nd Cl.	3rd Cl.	Other Wagons	Total
Peking-Hankow	22	32	91	81	226
Peking-Mukden	50	40	152	49	291
Tientsin-Pukow	25	28	101	41	195
Shanghai-Nanking	9	13	78	1	101
Shanghai-Hanchow-Ningpo	6	19	89	12	126
Peking-Suiyuan.........	7	15	32	40	94
Chengtai	3	10	25	13	51
Taokow-Chinghua.......	2	4	10	2	18
Kaifeng-Honan	—	9	21	18	48
Kirin-Changchun	1	4	9	3	17
Chuchow Pinghsiang	—	1	6	9	16
Canton-Kowloon........	3	6	22	10	41
Changchow-Amoy.......	—	1	5	1	7
In 1918...........	128	182	641	280	1,231
In 1915...........	—	—	—	—	1,280

TABLE VI.

Rolling stock (Goods).

(Chinese State Railways.)

Lines	Covered	Open	Special	Total	Capacity in tons	
					Total	Average per waggon
Peking-Hankow	621	1,990	47	2,658	66,625	25
Peking-Mukden	445	2,841	130	3,416	72,028	21
Tientsin-Pukow	546	808	38	1,392	33,390	21
Shanghai-Nanking	338	83	16	437	10,859	24
Shanghai-Hanchow-Ningpo	284	220	2	506	14,434	28
Peking-Suiyuan	83	769	—	852	23,960	28
Chengtai	146	475	6	627	12,810	20
Taokow-Changhua	9	176	4	189	5,346	28
Kaifeng-Honan	39	161	—	200	4,000	20
Kirin-Changchun	51	177	8	236	4,805	20
Chuchow-Pinghstang	—	183	—	183	3,633	20
Canton-Kawloon	37	26	4	67	1,555	23
Changchow-Amoy	3	6	—	9	180	20
In 1918	2,062	7,915	255	10,772	243,065	23,5
In 1915	—	—	—	10,652	234,070	22

The ordinary capacity of wagons is 20 tons. The capacity of all new wagons is 40 tons.

TABLE VII.

Amount of Capital of Chinese State Railways.

Lines	Capital in dollars[1]	Cost per kilometre in dollars
Peking-Hankow	102,665,956	78,631
Peking-Mukden	69,771,530	70,716
Tientsin-Pukow	101,437,711	91,646
Shanghai-Nanking	30,711,075	93,890
Shanghai-Hanchow-Ningpo	22,125,378	77,254
Peking-Suiyuan	28,956,594	59,036
Chengtai	22,137,583	91,120
Taokow-Chinghua	7,377,985	48,395
Kaifeng-Honan	13,558,556	73,289
Kirin-Changchun	6,616,318	51,824
Chuchow-Pinghsiang	4,813,836	33,192
Canton-Kowloon	15,585,379	108,764
Changchow-Amoy	2,643,632	94,415
Total in 1918...	428,401,535	78,275
Total in 1915...	409,523,352	75,226

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[1] For purposes of comparison the Chinese dollar must be reckoned at its pre-war value.

1 dollar = 1 fr. 50.
10 dollars = 1 pound sterling.
2 dollars = 1 gold dollar.

TABLE VIII.

Number of Kilometres covered by the Trains.

(Chinese State Railways.)

Lines	Passengers	Goods	Total
Peking-Hankow	2,300,500	3,755,179	6,055,679
Peking-Mukden	2,421,073	3,218,743	5,639,816
Tientsin-Pukow	1,382,850	2,390,642	3,773,492
Shanghai-Nanking	1,483,145	849,571	2,332,717
Shanghai-Hanchow-Ningpo	706,444	289,977	996,421
Peking-Suiyuan	530,906	818,265	1,349,171
Chengtai	211,091	851,235	1,062,326
Taokow-Chinghua	130,866	236,406	367,272
Kaifeng-Honan	340,655	153,939	494,594
Kirin-Changchun	204,327	432,163	636,490
Chuchow-Pinghsiang	76,632	151,041	227,673
Canton-Kowloon	286,181	145,006	431,187
Changchow-Amoy	28,086	3,318	31,404
Total in 1918...	10,102,757	13,295,485	23,398,242
Total in 1915...	9,572,995	10,921,655	20,494,650

TABLE IX.

Number of Passengers.

(Chinese State Railways.)

Lines.	Number of Passengers.	Number of Passengers per kilometre.	Receipts (Dollars).	Average length of line covered by one passenger.
Peking-Hankow	3,615,914	421,489,408	5,268,776	116
Peking-Mukden	3,577,703	614,494,387	7,638,917	171
Tientsin-Pukow	2,446,283	389,497,269	4,990,150	159
Shanghai-Nanking . .	6,399,082	416,119,709	2,850,415	65
Shanghai-Hanchow-Ningpo	5,078,247	198,731,432	1,580,018	39
Peking-Suiyuan	859,491	57,803,566	869,592	67
Chengtai.	273,756	30,846,576	809,676	112
Taokow-Chinghua . .	238,270	10,500,525	136,114	44
Kaifeng-Honan.	592,697	44,291,038	556,727	75
Kirin-Changchun . . .	383,437	30,381,866	529,448	79
Chuchow-Pinghsiang	128,736	5,660,446	47,776	43
Canton-Kowloon . . .	1,763,197	97,799,806	740,734	55
Changchow-Amoy . .	118,565	2,982,948	22,490	52
Total in 1918. . . .	25,475,379	2,320,798,976	25,740,841	91
Total in 1915. . . .	26,024,500	1,901,524,065	20,043,209	73

TABLE X.

Tons of Merchandise.

(Chinese State Railways.)

Lines.	Tons.	Number of kilometric tons.	Receipts (dollars).
Peking-Hankow	3,932,303	1,093,928,104	16,458,954
Peking-Mukden	6,013,682	908,385,854	11,463,678
Tientsin-Pukow.......	2,315,832	718,268,051	5,948,227
Shanghai-Nanking	1,131,302	252,703,380	1,513,398
Shanghai-Hanchow-Ningpo	464,787	52,266,071	677,382
Peking-Suiyuan	1,305,378	134,312,867	3,128,177
Chengtai	1,131,581	89,668,995	2,375,419
Taokow-Chinghua	935,081	67,037,061	765,908
Kaifeng-Honan.	393,407	28,675,713	545,501
Kirin-Changchun	448,449	43,823,717	1,094,514
Chuchow-Pinghsiang. . .	378,886	29,246,395	387,055
Canton-Kowloon......	95,308	6,442,733	120,772
Changchow-Amoy.....	5,688	46,930	1,550
Total in 1918......	18,551,684	2,425,807,677	44,490,538
Total in 1915......	15,910,375	2,250,774,630	32,473,043

TABLE XI.

Consumption of Fuel.

(Chinese State Railways.)

Lines	Tons	Expenditure (dollars)	Price per ton (dollars)	Weight per train per kilo. (kilog.)	Cost per train per kilo. (Cents).
Peking-Hankow....	150,916	906,042	6.00	24.92	14.96
Peking-Mukden	168,110	834,025	4.96	30.36	14.78
Tientsin-Pukow	101,932	695,236	6.82	27.45	18.42
Shanghai-Nanking . .	48,185	862,869	17.91	20.86	37.28
Shanghai - Hanchow-Ningpo	30,338	627,465	20.68	31.00	62.76
Peking-Suiyuan	50,602	308,688	6.10	37.50	23.00
Chengtai	21,158	104,485	4.94	19.92	9.84
Taokow-Chinghua . .	9,059	51,588	5.69	25.06	14.29
Kaifeng-Honan	12,722	94,142	7.40	25.72	19.03
Kirin-Changchun . . .	18,133	134,583	7.42	30.44	21.12
Chuchow-Pinghsiang	5,767	23,841	4.13	25.33	10.47
Canton-Kowloon . . .	13,850	306,465	22.13	32.12	71.07
Changchow-Amoy . .	541	10,820	20.01	17.23	34.48
Total in 1918. . .	631,313	4,960,260	7.86	26.98	21.20
Total in 1915. . .	504,285	3,389,461	6.72	24.61	16.53

TABLE XII.

Receipts in dollars [1]

(Chinese State Railways.)

Lines	Transports	Miscellaneous	Total (Dollars)
Peking-Hankow	23,634,838	187,783	23,822,621
Peking-Mukden	20,629,634	223,898	20,853,532
Tientsin-Pukow.........	12,407,087	196,272	12,603,359
Shanghai-Nanking	4,767,292	86,144	4,853,436
Shanghai-Hanchow-Ningpo	2,370,193	27,157	2,397,350
Peking-Suiyuan	4,216,541	77,856	4,384,397
Chengtai	3,161,653	48,784	3,210,437
Taokow-Chinghua	915,832	33,085	948,917
Kaifeng-Honan	1,229,957	40,248	1,270,205
Kirin-Changchun........	1,761,920	14,224	1,776,144
Chuchow-Pinghsiang.....	550,420	3,972	554,392
Canton-Kowloon	887,839	23,360	911,199
Changchow-Amoy	44,861	1,298	46,159
Total in 1918...	76,518,059	1,074,094	77,652,153

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[1] For value of dollar, see footnote to Table VII.

TABLE XIII.

Expenditure (in dollars).

(Chinese State Railways.)

Lines	Expenditure
Peking-Hankow	7,977,853
Peking-Mukden	6,903,148
Tientsin-Pukow	6,334,726
Shanghai-Nanking	2,969,196
Shanghai-Hanchow-Ningpo	2,065,832
Peking-Suiyuan	2,859,949
Chengtai	1,337,385
Taokow-Chinghua	426,454
Kaifeng-Honan	704,622
Kirin-Changchun	1,075,219
Chuchow-Pinghsiang	552,598
Canton-Kowloon	1,029,083
Changchow-Amoy	86,550
Total in 1918	34,332,425

TABLE XIV.

Expenditure per kilometre in operation in 1918.
Coefficient of operation in 1915, 1916, 1917, 1918.

Lines	Expenditure per kilometre in operation in 1918	Coefficient of operation for expenditure and receipts.			
		1915	1916	1917	1918
	Dollars				
Peking-Hankow	6.076	42	34	37.4	33.1
Peking-Mukden	7.081	49	42	38.4	33.5
Tientsin-Pukow	5.723	62	50	50.9	50.2
Shanghai-Nanking	9.077	59	50	52.8	61.1
Shanghai-Hanchow-Ningpo	7.216	77	80	81.2	86.2
Peking-Suiyuan	5.777	54	60	58.5	65.1
Chengtai	5.505	63	59	50.8	41.7
Taokow-Chinghua	2.798	60	46	41.3	44.9
Kaifeng-Honan	3.803	46	44	4.63	55.4
Kirin-Changchun	8.277	84	82	69.7	60.5
Chuchow-Pinghsiang	6.095	68	95	82.3	99.6
Canton-Kowloon	7.181	99	105	104.6	112.9
Changchow-Amoy	3.090	249	158	159.5	187.5

II.

INLAND NAVIGATION.

The Chinese Delegation regrets that at present it is not in possession of the data necessary for drawing up a complete report on the transport situation on navigable waterways in China. Under these circumstances it has prepared the following statement with the figures at its disposal.

General Review of the Situation of Transport on Waterways.—For the purpose of direct import and export on national navigable waterways, China possesses a river — *the Yang-Tze*—which, in view of its present trade and future possibilities, its riparian population and navigability, is inferior to no other river in the world.

When the river is in flood, vessels with a draught of 8 m. 50 can ascend as far as Hankow, which is 610 (1) miles from the sea; vessels with a draught of 3 m. 10 can ascend a further 360 miles as far as Ichang, and vessels with a draught of 1 m. 50 can continue 400 miles as far as Chungking; the total distance is therefore 1,370 miles from the sea.

Apart from the Yang Tze (including the Whangpoo), the 20 kilometres of the river Liao at Newchang, the 52 kilometres of the river Min at Pachoda Anchorage, and the 116 kilometres of the Delta of Sikiang at Whampoa (Canton), China has no navigable waterways suitable for long-distance navigation.

For coasting vessels, there are the 47 miles from Haiho to Tien Tsin; 12 miles of the river Yung as far as Ningpo; 30 miles from Wukiang to Wenchow; 41 miles of the river Min to Foochow (when the improvements at present in progress have been completed) and 80 miles from the Sikiang Delta to Canton.

For vessels of shallow draught (1 m. 85 for example) — but of considerable tonnage — employed on rivers and estuaries, certain tributaries of the Yang-Tze, and 180 miles of the Sikiang at Wuchow are available.

It is impossible to estimate the extent of the waterways which can be navigated by small motor-craft.

The above classification is not absolutely strict; it is of a general nature and has been compiled for the purpose of this statement.

The ports situated at the mouth of rivers, that is to say *Newchwang, Tientsin, Shangai, Ningpo, Wanchow, Pachoda Anchorage*, and *Canton*, are also seaports.

As to seaports properly so-called, there are only *Chinwangtao, Chifu, Santuao, Amoy, Swatow, Kiungchou (Hainan Island)* and *Pakhoi*.

It should of course be borne in mind, when the question of Chinese ports is under discussion, that only " open ports " are meant—*i.e.* ports which have been opened either by treaty or voluntarily.

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[1] Nautical mile 1,852 m.

In addition to these ports, there are several important anchorages on the 2,500 miles of the Chinese coast line. There is a considerable amount of native commerce in these ports, and it is constantly increasing. There can be no doubt that several of these ports will develop considerably in the future, and even now — considering the lack of communication by rail and water with the " hinterland ", they are comparatively important.

Present Traffic Regime for Foreign Vessels on Chinese navigable Waterways.—1. In accordance with certain treaties, the subjects of certain Powers, commonly known as " Treaty Powers ", have the right to trade with ports known as " treaty ports ". Other ports have also been voluntarily thrown open to foreign trade. These ports together form what are known as " open ports ". The traffic coming in within the scope of these treaties comprises import and export trade, and the coasting traffic between open ports.

2. Under the " Inland Water Steam Navigation Regulation ", the subjects of these " Treaty Powers " have the right to carry on coasting traffic under their own flag, between open and non-open ports, whether situated on the coast or on the rivers.

3. In accordance with the regulations of the Sikiang, the subjects of " Treaty Powers " are entitled to certain additional trading facilities on this river ; these comprise special rights for foreign commerce and relate to trade between the Chinese ports on the *Sikiang* and *Hongkong* and *Macao.*

Particulars as to Open Ports.

ANTUNG.—On the Yalu,—a frontier river—situated 12 miles from the sea. Navigable depth : about 3 m. 10. Has railway communication with Manchuria and the Corea. Has river communications with the interior by small boats.

NEWCHWANG.—On the river *Liau-ho*, 13 miles from the sea. Navigable depth about 5 m. 25. Has railway communication with Manchuria and Chi-Li. Has river communication with the interior by small boats. Work is being carried on with a view to improving the approaches ; above Newchwang the river can be improved.

CHINWANGTAO.—Seaport, belonging to the " Kailan Mining Company ". Has railway communications, principally used for the transport of coal.

TIENTSIN.—On the *Hai-ho*, situated 47 miles from the sea. Navigable depth about 3 m. 40 to 4 m. 30. Very important railway centre ; heavy river traffic, by means of small boats, with the interior. Intensive works for upkeep of the bar and river. Although the greatest navigable depth to be hoped for from any works that may be undertaken will probably not exceed 6 m. 10, Tientsin, is a very important port by reason of its commerce with the "hinterland", which has been much developed, and of its inland river communications.

LUN-KOU.—Seaport of small importance, having neither rail or river communication with the interior.

CHI-FU.—Seaport, without rail or river communication with the interior, but with a rich though inextensive "hinterland". An artificial harbour is course of construction ; a railway is projected.

SHANGHAI.—On the *Wangpu* (12 miles from the sea), which runs into the estuary of the Yang-Tse ; is one of the chief industrial and commercial towns in China ; has rail and river communications with the interior, but these do not yet adequately supply the needs of Shangai's immediate "hinterland".

In a certain sense, however—in its capacity as a maritime commercial port situated at the mouth of the Yang-Tse — Shanghai has all the provinces situated on the Yang-Tse from Sze-Chwan as " hinterland ".

Costly and extensive works are being undertaken with a view to improving the depth of the entrance channels. The present navigable depth is 9 m. 25 at high tide. A scheme is at present being considered with the object of providing entrance and anchorage for ships having a draught of 14 m.

THE PORTS OF THE YANG-TSE:—Before reviewing these in detail, a few remarks on the river itself may be made. On the higher reaches, a depth of 9 m. 25 is available as far as Hankow. When the river is low, this depth is reduced, during a limited period, to 3 m. 10 at certain difficult spots.

This situation can doubtless be improved, but although it is permissible to hope that a depth of 9 m. 25 throughout the whole year may be obtained, it is nevertheless by no means certain. This important question has been mooted, but has not yet been officially studied by the Government.

The 360 miles of the river between Hankow and I-Chang, known as the Middle Yang-Tse, have an average available depth of 3 m. 10. Owing to the very unstable character of the channel, the improvement of this portion of the river meets with great difficulties.

The 400 miles of river between I-Chang and Chung-King, known as the Upper Yang-Tse, are studded with rapids ; nevertheless, steamers with a length of 60 m. and a draught of 1 m. 55 can use it during the greater part of the year. Incidentally, it should be noted that the level of this section varies between 28 and 37 m. ; 52 m. 50 has, however, been registered.

The rapids—which, as it were, divide the river into reaches—cannot be entirely regulated, but certain improvements could be executed which would facilitate navigation and assure it a certain security. This question was at one time considered officially. The importance of this part of the river is accentuated by the extreme difficulty of constructing railways in the vicinity, owing to the high mountain ranges which cut the river at right angles.

It should be added that the Yang-Tse, in its course from Chung-King to the sea, carries everything that is necessary for a population estimated at 200,000,000 souls.

On the Lower Yang-Tse the ports of *Chen-Kiang*, *Nanking*, *Wu-Hu*, and *Kiu-Kiang*, are at present relatively unimportant because their " hinterland " is not being utilised.

PU-KOU.—Situated 237 miles from the sea, at the terminus of the Tientsin-Pu-Kou railway. The depth of its approaches reaches 9 m. 50. There will doubtless be a great concentration of railway traffic from the north and east at this port, which has consequently a great future.

HANKOW.—610 miles from the sea. Is the commercial and industrial metropolis of Central China, with a future as promising as — if not more so — than that of Shanghai.

It commands an immense hinterland, as it is the port of transhipment, not only for the Middle and Upper Yang-Tse, but also for the River *Yuen-Kiang*, Lake *Tung-Ting* and the River *Han-Yang*. It is situated at the terminus of the Pekin-Hankow Railway and of the Hankow-Canton railway, which is almost finished.

YU-CHOU.—At the entry of Lake Tung-Ting. A port of no commercial importance.

CHANG-SHA.—90 miles up the River Yuen. A port of great commercial importance, accessible for the greater part of the year for vessels of relatively large draught.

Locks are required to improve the channel.

SHA-SHI.—On the Middle Yang-Tse; a comparatively unimportant port.

I-CHANG.—On the upper section of the Middle Yang-Tse, its importance lies in the fact that it is a port of transhipment for the commerce of the Upper Yang-Tse.

CHUNG-KING.—1,370 miles from the sea. Commercial and industrial centre for the great part of Western China, with its intensive production. It has, as yet, no railway communications, and depends for its traffic entirely upon the Yang-Tse. This port also has prospects of a brilliant future.

Returning to the coast, there are Ning-Po, Wen-Chow and Santuao, ports which are at present, of small commercial importance, doubtless because they lack the means to exploit their hinterland.

FU-CHOW.—Vessels drawing 7 m. 40 may regularly use the Pachoda Anchorage, which was formerly only a port of call for packet boats. No railway communications; the rivers which enter the sea at this point are of no importance. The port will, no doubt, develop considerably when it is able to exploit its hinterland. Works have been undertaken to improve the channel between the Pachoda Anchorage and Fu-Chow.

Amoy and Swatow.—These sea-ports have a considerable amount of trade. Swatow possesses a small railway, and they both have river communication with the interior. The former will take vessels of any draught ; the latter vessels drawing up to 7 m. 40.

Canton.—The commercial and industrial metropolis of Southern China. Canton can only take vessels drawing 6 m. 80, and improvements in this port are likely to prove very costly.

Its outer harbour, Whampoa, is accessible for vessels drawing 8 m., but may be rendered accessible for larger vessels. Whampoa will doubtless become an important port in the future, as it will be connected with the future Hankow-Canton line, and has the advantage of extensive river communications with the interior, including the waterway of the Sikiang.

The Ports on the Sikiang.—*Kong-Moon, Sam-Shui* and *Wu-Chow* are accessible only to vessels built to navigate rivers and estuaries, that is to say, their external commerce is limited to that with Hongkong and Macao. The average depth is four meters. Above Wuchow there are rapids navigable only by vessels of small draught ; only these craft and the Chinese types of vessels (junks) visit the ports above Nanning and Lung-Chow.

The possibilities of improving navigation conditions on the sections in which the rapids occur have not yet been ascertained.

To return to the coast :

Kiung-Chow (or Hoi-How), situated on the coast north of Hainan, is of comparatively small importance.

Pak-Hoi, in the Gulf of Tonkin, is also at present a port of comparatively small commercial value, but, with the prospect of communications with the interior, will probably develop considerably.

Navigation by Chinese Steamships.—For various reasons, the development of steamship navigation in China has been very slow ; the principal reason for this has been the lack of laws to protect the interests of Chinese shipowners.

The Government is at present endeavouring the improve this state of affairs.

The present tonnage of long-distance vessels under the Chinese flag amounts to 31,334 tons; the available tonnage of coasting vessels in 1918 amounted to 80,247,706 tons, but there are a great number of small steamships on coasting and river services.

Foreign Navigation.—Apart from long-distance vessels, there are a large number of vessels under foreign flags engaged in coastal trade, in river trade, from one "Treaty Port" to another, and in trade between "Treaty Ports" and "Non-Treaty Ports".

It must be noted that the trade with small vessels is carried on by the nationals of certain States according to the provisions of Treaties.

Traffic Statistics.—The only available statistics are those giving the tonnage of vessels registered by the Maritime Customs in 1912 and 1918. The list of these is as follows:

	1912		1918	
An-Tung	231,586	tons	230,040	tons
New-Chwang	1,255,654	»	425,694	»
Chin-Wang-Tao	694,352	»	1,527,541	»
Tientsin	2,340,493	»	1,598,292	»
Lun-Kow		»	37,813	»
Che-Fu	3,132,465	»	1,835,574	»
Shanghai	18,643,803	»	14,049,293	»
Chen-Kiang	6,305,563	»	7,011,361	»
Nanking	5,813,127	»	7,191,850	»
Wuhu	6,147,003	»	7,380,458	»
Kiu-Kiang	5,779,662	»	6,900,102	»
Hankow	5,271,620	»	5,925,693	»
Yu-Chou	1,859,443	»	1,569,289	»
Changsha	523,579	»	349,227	»
Sha-Hsi	716,302	»	858,577	»
I-Chang	530,860	»	585,946	»
Chung-King	79,761	»	69,690	»
Ningpo	1,861,575	»	1,797,255	»
Wenchow	117,206	»	138,897	»
Santuao	62,969	»	73,236	»
Fu-Chow	1,040,421	»	632,514	»
Amoy	2,140,913	»	1,251,245	»
Swatow	3,066,767	»	1,857,688	»
Canton	5,067,534	»	3,238,447	»
Kong-Moon	472,914	»	514,982	»
Sam-Shui	1,245,619	»	1,424,112	»
Wu-Chow	678,368	»	797,298	»
Nanning	43,099	»	87,500	»
Kiung-Chow (Hoihow)	746,354	»	401,864	»
Pak-Hoi	220,264	»	60,138	»

Note.—With regard to the large rivers in the north of China (Amur, Sungari, Ussuri, etc.), the information which we possess is hardly detailed enough for inclusion in this survey.

CZECHO-SLOVAKIA.

I.

RAILWAYS.

The Western portion of the Republic of Czecho-Slovakia consists of the territories of the Czech Crown lands: Bohemia, Moravia and Silesia, which, before the dissolution of the Austro-Hungarian Empire, formed the North-West portion of Austria, and the Eastern portion consists of Slovakia and Sub-Carpathian Russia, which formed the Northern portion of Hungary before the revolution of October 28th, 1918.

Czecho-Slovakia has the shape of an elongated trapezoid of a length of approximately 900 kilometres and an average width of 200 kilometres. The pointed shaped territory on the extreme East (Sub-Carpathian Russia) has a maximum width of only 80 kilometres. The total area of the Republic is about 139,000 square kilometres; the population numbers more than 13,000,000.

The geographical formation of the Republic of Czecho-Slovakia, as also its situation in the centre of Europe, gives an extraordinary importance to the Czecho-Slovak Railways from the point of view of international transport; the Republic of Czecho-Slovakia — as regards the direction North to South — is, in fact, essentially a "transit" State.

Plant.

(a) *State of Lines, Bridges, etc.*

The Republic of Czecho-Slovakia has inherited from the former Austro-Hungarian Monarchy a system of railways composed as follows:—

State railways	8,168 km.
Privately owned railways worked by the State	4,234 »
Total for lines worked by the State	12,402 km.

Privately owned railways worked by private companies . .	1,077 km.
Railways owned by foreign administrations	115 »
Total of lines in Czecho-Slovakia	13,594 km.

1,589 kilometres of State railways and 4,375 kilometres of privately owned railways are of secondary importance. All these railways are generally of normal gauge. The railway system — particularly in Bohemia — is highly developed ; there are 13 km. of lines in 100 square kilometres of territory. Slovakia the system is less extensive and only attains 6 km. of lines to 100 square kilometres of territory.

One may therefore say that on an average the Republic of Czecho-Slovakia has 10 kilometres of line to 100 square kilometres of territory. Immediately after the collapse of the Austro-Hungarian Empire, the Republic of Czecho-Slovakia was obliged to take over the whole administration of this network of railways, of which two-thirds had been hitherto administered by the Viennese or Hungarian authorities. A central office of management was at once instituted at Prague, which was able, in spite of the difficulties of the time, not only to maintain the working of the lines but also to steady the whole situation.

At the end of three months the new Ministry of Railways at Prague was ready to take over the central administration ; the central office was suppressed and seven administrative areas were organised ; these administrations (Plzen, Prague, Hradec Kralové, Brno, Olomouc, Bratislava, Kosice) are now responsible for the administration of the state railways. The section of lines under these different administrations varies from 1,300 to 2,100 kilometres.

The new administration was faced with difficulties whose immediate solution was extraordinarily complicated.

In the first place it was necessary to put traffic on a basis corresponding to the needs of the liberated territories, as well as to the new orientation of foreign traffic.

The general flow of traffic which went formerly from north to south was replaced by traffic from west to east and east to west, following the longitudinal axis of the Republic.

The principal routes for exports generally follow the lines Prague-Podmokly and Prague-Vsetaty-Privory-Decin for the North Sea and the Baltic : Prague-Ceska Trebova-Olomouc-Bohumin for the Baltic, crossing Poland, and for the Black Sea ; the lines Prague-Brno-Bratislava give access to the Adriatic Sea.

The great international line Bordeaux-Paris-Prague-Warsaw and Prague-Bucarest-Black Sea crossed the Czecho-Slovak Republic in its longitudinal direction on the section Cheb-Prague-Bohumin.

The conditions of these lines not completely meeting present needs and the existing lines in the longitudinal direction being insufficient in number and for the most part of weak construction, work had to be started immediately on their reconstruction.

There is a marked lack of uniformity in the rails composing the Czecho-Slovak railway system due to the fact that our railways originate from various private companies.

To-day, for example, on some of our main lines we still have rails of an old type of which the average metre weights are 33.05 kgs, 34.50 kgs, 35.35 kgs; in the case of certain new rails on lines used by express trains the average weight per metre is 42,80 kgs (in Slovakia) and 44,35 kgs.

On lines not used by fast trains a newer type of rail is in use weighing 34.50 kgs and 35.65 kgs per metre. Technical uniformity cannot be attained at once; the Ckecho-Slovak administration is, however, endeavouring to strengthen the tracks and the bridges by degrees so as to be able to increase the maximun load from 14.5 tons per axle-load to 20 tons on the main lines and to 16 tons on lines of secondary importance.

The bridges are calculated to carry a load of 16 tons per axle; and it is possible to increase their strength by some improvements.

The highest speed allowed on the Austrian lines was 90 km. per hour and on the majority only 80 km. per hour. In Slovakia the maximum speed was 60-70 km. per hour.

It is now proposed to increase the maximum speed on the principal lines for international traffic to 100-120 km.

(b) *Urgent works to be undertaken.*

It was of the greatest importance to arrange for communications between the east and west of the Republic and to carry out speedily the work necessary to ensure operation of the lines already in existence. New junction lines had also to be laid down, and the most important portions of the line strengthened.

First of all a regular service was established with the metropolis of Southern Slovakia, Bratislava, the principal Danube port of the Republic of Czecho-Slovakia.

With this object the Breclava-Bratislava line was strengthened and adapted for fast trains, and double tracks were laid on certain portions.

Owing to the delimitation of frontiers, particularly in Slovakia, certain sections of our lines no longer have their junctions with the remainder of the system. Liaison with the lines split up by the new frontier in the district of Gemer in Slovakia was effected near Banrieve. Communication with the Ruthene territory was completed by the construction of the line Banovce-Vajany (19 km. still under construction).

Double tracks are being laid on the line Ceska-Trebova-Olomouc line and on other lines in Bohemia with a total length of 112 km. (7 %, of the length of double track lines prior to the war).

It has been necessary to establish more than 30 new frontier stations on the frontiers of Austria and Hungary; as the existing stations were not originally built for this purpose and their installations are not therefore suitable for customs and other frontier service, there are temporary difficulties, which can only be surmounted slowly.

The present Czecho-Slovakian railways have only suffered damage from the war on a few lines of the systems of Eastern Slovakia and Ruthenia.

But, on the other hand, the invasion of South-Eastern Slovakia by bands of Bolshevist Magyars caused considerable damage in those regions. The damage done to the superstructure of the track and to the bridges has for the most part already been repaired.

(c) *Work required for final Constructions.*

During the war all the Czecho-Slovak railways suffered greatly from lack of upkeep and the resulting abnormal wear and tear.

Work on the permanent way was restricted to the most urgent repairs, the greater part of all repairing material being used within the war zone.

For this reason, repairs in the immediate future will greatly exceed the normal.

Before the war, for example, there was an annual replacement of 8 % of the 18,000,000 sleepers at present on the railways of the Czecho-Slovak Republic.

The replacement of sleepers fell in 1916 to about 5 % ; in 1917 to 4 % ; in 1918 to 3 %, and on certain lines even to 2 %.

In 1919 and 1920 only 3 % of the sleepers were replaced. Sleepers were difficult to obtain and financial resources were low. In consequence these two years have in no way contributed to the restoration of the superstructure.

During the next five years it is proposed that sleepers should be replaced at a rate exceeding by 20 % annually the pre-war rate ; in consequence a complete renewal will be probably obtained by 1926.

This will also be the case as regards the laying of new rails etc.

(d) *Improvements and the Creation of Proposed New Lines.*

In addition, it has been necessary to draw up a scheme for the construction and systematic improvement of the Czecho-Slovak lines.

By the law of March 30, 1920, the National Assembly decided upon a programme extending over several years, according to which 6½ milliards of Czecho-Slovak crowns were allocated to proposed new construction.

When this programme is put into effect there will be direct connection between the Western and Eastern parts of the Republic by means of a new line through the centre of Slovakia ; the railway system will be adapted to the new itineraries, and equipped to meet the future economic needs of the country.

Fifteen new lines are to be constructed of a total length of 558 kilometres, of which 389 kilometres will be in Slovakia, and 111 will constitute junction lines between the Slovak railways and the railways in the other parts of the Republic.

Transport on the present lines will be particularly improved by the construction of double tracks, for before the war, only 1,607 kilometres of the lines at present belonging to the Czecho-Slovak Republic had double tracks.

After the proposed construction has been carried out, thedou ble-tracked railways will represent 16 % of the total railway system.

At the same time all the stations of importance will be enlarged in accordance with the altered requirements of present transport conditions. The principal stations on the lines intended for international traffic will be transformed into marshalling stations.

(e) *Rolling-stock.*

A great difficulty with which the Czecho-Slovak administration has had to contend from the beginning has been the serious shortage of rolling-stock. The allocation commission established according to Article 318 of the Treaty of Saint-Germain has not yet completed the distribution of the rolling-stock of the old state railways of Austria Hungary. In consequence, the railways of the Czecho-Slovak State, as indeed the railways of the other Austrian Succession States, have not so far received the material which belongs to them, except the vehicles specially constructed for them during the last two years. In these circumstances, we can only speak of the condition of the material in the undistributed park at present on the territory of the Czecho-Slovak Republic. During the war a large number of locomotives and wagons were sent from the present territory of the Czecho-Slovak Republic to the frontiers of former Austria-Hungary within the war zone. A part of this stock has become booty for the Allies ; a much larger part has been retained in certain states and immobilised for various reasons. This state of affairs is one of the principal causes of the very serious transport crisis which threatens Central Europe, a crisis which can only be adjusted by the final and rapid distribution of rolling-stock as provided for in the Treaties of Peace.

(a) *Locomotives.*—Table No. 1 shows the present number of locomotives in the common park belonging to the Czecho-Slovak State railways, according to a comparison between the pre-war situation and actual conditions at present.

TABLE No. I.

		Number of locomotives now on the lines, Czecho-Slovak, June 30, 1914. 1	Czecho-Slovakia's share of locomotives constructed during the war. 2	Total number of locomotives belonging to Czecho-Slovak lines. 3 = 1 + 2	Number of locomotives in actual use on the Czecho-Slovak lines in 1918. 4	Unfavourable balance against Czecho-Slovakia. 5 = 3 — 4
Locomotives in the common park.	In Bohemia, Moravia, Silesia.	2,822	450	3,272	2,783	489
	In Slovakia.	750	213	963	191[1])	772
	Total . .	3,572	663	4,235	2,974	1,261

The number of locomotives in the common park of which the Czecho-Slovak State railway system is now short is therefore 1,261.

Slovakia, especially, had practically no locomotives, and had to be assisted by locomotives from the west of the Republic. The existing shortage thus became more acute, and constituted one of the principal causes of the transport difficulties in Czecho-Slovakia.

The administration of the Czecho-Slovak railways had to make great efforts in order gradually to improve the situation as regards locomotives and prevent a serious transport crisis.

Ninety-two locomotives obtained under the terms of the Armistice with Germany were ceded to the Czecho-Slovak administration by the Allied States. By advances made in anticipation of the final distribution and by other means, the Czecho-Slovak railways have obtained so far more than 300 locomotives. By purchases abroad and from firms in the country (Première usine de locomotives de la Bohême et Moravie, at Prague; Breitfeld Danek & Co., at Slany; Maison Skoda, at Plzen) 200 locomotives have been procured.

In this way at the end of 1920 the number of locomotives increased to 3,560. This number is still absolutely insufficient compared with the pre-war situation, especially if account be taken of present-day conditions, for it must be remembered that the number of locomotives under repair has increased, the quality of the coal is extremely bad, the hours of work have been reduced, while the requirements of the country's economic life are continually growing.

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[1] During the Bolshevik invasions 99 Slovak locomotives and 15 locomotives from Bohemia were carried off.

(b) Wagons.—The insufficiency of common park wagons on Czecho-Slovak lines is an even greater obstacle to the development of traffic than the shortage of engines, and it is also a hindrance to the economic life of the country.

The figures in Table No. 2 reveal the important fact that the number of wagons in the Czecho-Slovak Republic is decreasing in an alarming manner. The statistics of transit wagons in the frontier stations show that this decrease steadily continues. The Czecho-Slovak Republic, where the number of common park wagons is extremely low, is losing every day an important number of vehicles. The number of wagons which have not been returned from foreign countries amounted on January 31st 1912 to 4,776 covered wagons and 10,374 open high-sided trucks.

The reason for this is that the number of wagons which leave Czecho-Slovak, an essentially exporting State, is considerably greater than the number of loaded wagons which enter the country ; the empty wagons are only returned after great delays, if they are returned at all. The same applies to wagons in transit.

TABLE NO. 2.

Results of the census of coaches and wagons belonging to the common park.

		Coaches and guards vans.	Goods trucks.	Total.	Deficit of coaches and wagons in comparison with the pre-war situation.
Census. . .	15-III-1919	7,236	59,732	66,968	70,900
	8-IV-1920	7,347	47,172	54,519	83,349
DIFFERENCE		+ 111	— 12,560	— 12,449	—

This situation, from which the Czecho-Slovak Republic suffers severely, is caused by the uncertainty with regard to the ownership of the wagons ; the park of wagons is common to all the Austrian Succession States and ought therefore to be at the common disposal of these States. In reality, each of these States, owing to practical requirements, has come to regard the park wagons which happen to be on its territory as belonging to it, or at any rate as intended to serve its own interests first.

As a result of these obstacles in the way of the return of empty wagons to their line of origin, the exporting States find themselves in an intolerable situation. On the one hand they are obliged to allow wagons to leave the country in order not to leave their factories idle, and, on the other, their internal traffic is endangered by the constant departure of wagons from their territories.

Moreover, the rolling-stock is not kept in proper repair, because the ownership of the wagons is uncertain, and the majority of the States where the vehicles are retained are quite unable to repair the stock which encumbers their lines. Hence, while the total number of wagons in Central Europe is more than sufficient, certain succession States, and especially the Czecho-Slovak Republic, suffer from a shortage of wagons which absolutely prevents their economic development. In order to improve the traffic situation in Central Europe, it is essential that the common park, which beloged to the former Austro-Hungarian Monarchy, should be immediately and finally divided up. The conclusion of an international Convention for the mutual exchange and use of rolling-stock under the control of the League of Nations is thus becoming more and more indispensable.

Czecho-Slovakia has made a great effort to increase with her own resources her insufficient share in the common park stock. She has built in her own factories more than 20,000 wagons, and has bought from foreign countries several thousands of wagons, so that to-day the number of wagons marked "CSD" amounts to 25,000. In addition, 2,000 new private wagons have been included in her park. One thousand wagons, which by the terms of the Armistice are destined for France, have been repaired, but these wagons, in accordance with an agreement, are still being used on Czecho-Slovak lines.

All these sacrifices have produced no result owing to the reasons explained above.

It has only been possible to avoid an economic and social catastrophe owing to the efforts made to accelerate the circulation of wagons on internal lines, and also owing to the important purchase mentioned above, and to the special measures which the Czecho-Slovak administration has been obliged to take with regard to the traffic with certain neighbouring systems, such as, for example, the equal and detailed exchange of wagons.

(c) *Upkeep of rolling-stock.*—The number of engines under repair, particularly after the armistice, was very great (40 % as against 18 % before the war). By making use of private industry by the enlargement of repairing sheds, and, above all, by increased work, it has been possible to reduce the number of engines under repair from 37 % at the beginning of 1919 to 32 % at the end of 1920. Wagon repairs have advanced considerably. At the beginning of 1919, the number of passenger coaches under repair was 33 %, and of goods trucks 14 %. At the end of 1920 this percentage had fallen to 14.4 % in the case of passenger coaches and to 7.8 % for goods trucks. In all, the following repairs were carried out in 1920.

(a) *Locomotives:*

Heavy Repairs	645
Medium Repairs	1,797
Light Repairs	18,673
Total: Locomotives	21,115

(b) *Coaches, Guards' Vans and Postal Vans:*

Heavy Repairs	3,305
Medium Repairs	5,370
Light Repairs	48,949
Total: Coaches, etc.	57,624

(c) *Goods Trucks:*

Heavy Repairs	15,164
Medium Repairs	19,915
Light Repairs	288,895
Total: Goods trucks	323,974

Thanks to this effort Czecho-Slovakia has largely contributed to restoring to a satisfactory condition the rolling-stock on the lines of the Austrian Succession States. The number of repairing sheds at the present time (ten large sheds with 10,500 workmen, and 16 depot sheds with 4,300 workmen) is insufficient to keep in repair the number of wagons necessary for the future requirements of the economic life of the country, and the programme mentioned above provides for the constructions of four new repairing sheds.

Traffic.

(a) *Passenger Traffic.*

That Czecho-Slovakia is a transit State is shown by the fact that the time-tables of trains are largely based upon international time-tables.

The importance of passenger traffic in Czecho-Slovakia may be deduced from Table No. 3.

TABLE No. 3.

	Number of passengers conveyed.	Per kilometre of line in operation.	Number of kilometres travelled by passengers.	Length of journey per traveller in kilometres.	Comparison of length of line in operation.
Austrian Railways 1913.	153,518,550	10,968	5,804,066,266	37.81	14,029
Czecho-Slovak Railways 1919.	133,304,075	16,449	5,210,903,157	39.09	8,103

The number of passengers per kilometre carried on the Czecho-Slovak railways exceeds by 50 % the pre-war Austrian figure. The distance travelled per passenger on the Czecho-Slovak lines exceeds the Austrian average by 1.3 kilometres.

(b) *Goods Traffic.*

The time-tables for goods trains, particularly for through trains, (trains direct) also take into consideration relations with neighbouring States.

Present-day transit traffic is governed by a large number of agreements regarding complete trains loaded with one kind of goods, particularly with regard to the transport of coal from Upper Silesia to Italy via Czecho-Slovakia and Austria, and also transport from Austria to Roumania and from France and Austria to Poland. Moreover, loaded trains often convey goods in transit without being subjected to the above-mentioned agreements.

Table No. 4 represents goods traffic on the Czecho-Slovak railways in 1919, as compared with 1913.

This table shows to what extent traffic on the Czecho-Slovak railways has been reduced through lack of wagons, locomotives and coal. Although Czecho-Slovakia is primarily an industrial State, the present traffic, as compared over an equal distance in kilometres, represents only two-thirds, or less, of the pre-war goods traffic in Austria. Indeed, the requirements of industry as regards wagons cannot be satisfied.

The only demands which have been almost completely met are those in respect of coal transport, to which special attention is paid. In 1919, out of 1,651,133 wagons required, it was possible to load 1,549,792 wagons; in 1920, 1,648,883 wagons were required and 1,549,766 were delivered.

TABLE Nº 4.

Goods Traffic.

	Fast goods traffic.	Consignment by partly-loaded wagons.	Consignments by loaded wagons.	Total.	Per km. of line in operation.	Service consignments.	Grand total.	Per km. of line in operation.
	In Tons.							
Austrian State Railways in 1913	1,140,768	5,554,610	79,131,586	85,826,964	6,071	7,452,801	93,279,765	6,599
Czecho-Slovak State Railways 1919..........	326,666	1,648,235	31,582,293	33,557,194	4,109	3,877,664	37,434,858	4,584
	In Kilometric Tons.							
Austrian Railways in 1913......	148,095,844	890,356,040	11,184,364,542	12,309,564,326	870,030	1,228,108,352	13,537,672,678	957,712
Czecho-Slovak Railways in 1919....... ...	34,765,741	175,096,240	3,219,485,964	3,429,347,945	419,956	545,416,690	3,974,764,635	486,747

As Czecho-Slovakia is second in the list of European countries which produce sugar (Germany 2.7, Czecho-Slovakia 1.9, France 0.9, Holland 0.3, Belgium 0.3 million tons per annum) the period of the sugar-beet harvest (from the end of September until November) is a difficult time for the railways, — all the more so as the coal industry has to be supplied at the same time, and the country has also to be provided with food for the winter.

The following figures give some idea of the importance of these transports :

TABLE No. 5.

	Tons carried.		Number of wagons employed.	
	1919	1920	1919	1920
Beets.	1,544,421	1,750,462	127,082	125,282 *
Prepared beets.	871,576	1,083,885	67,661	77,928
Raw sugar	189,699	246,601	14,551	17,450
TOTAL.	2,605,696	3,080,948	209,294	220,660

Rates.

Immediately after the armistice, in order to avoid economic dislocation resulting from too sudden changes, it appeared expedient to maintain provisionally the Austrian and Hungarian regulations and rates, and only to change them gradually, taking into consideration the new situation.

As regards international goods traffic, there was at first a complete lack of established laws governing transport and administration, because the Czecho-Slovak Republic, as a new State, was not, on the one hand, subject to the provisions of the Bern Convention, and, on the other hand, its railways had ceased to be included in the Union of German Railway Administrations.

It was, therefore, necessary to regulate goods traffic with neighbouring countries by special agreements on rates concluded with the railway administrations. These agreements were naturally based on the Bern Convention with certain derogations due to the post-war situation. As regards relations with Austria and Hungary, the former regulations of the Austro-Hungarian system of operation have been kept in force up to the present.

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* The average working weight of wagons in use has increased from 12 to 13.9 tons, as the sugar industry has placed at the disposal of the railway 1,000 wagons (of 20 tons) which belong to it.

These regulations will shortly be replaced by the International Bern Convention, so that from next April the whole of the goods traffic will be carried out under the rules of the Bern Convention to which the Czecho-Slovak Republic has just signified its formal adherence in accordance with the Treaties of Peace.

As the monetary system of Czecho-Slovakia ceased to be the same as that of Austria and Hungary as from March 10th, 1919, it was necessary to abolish the common rates for foreign traffic, and to conclude arrangements with the railway administration of neighbouring countries, so as to enable goods to be despatched as far as the station of destination with a direct way-bill. Such agreements have been concluded with Austria, Germany, Poland, and are in course of preparation for traffic with Yugo-Slavia and Hungary.

Owing to its central geographical situation, the Republic of Czecho-Slovakia is a transit state of great importance, particularly as regards the south-north direction. Recognising this fact, the Czecho-Slovak State Railway Department encourages and endeavours to facilitate transit traffic on its lines. The present temporary difficulties are due solely to the shortage of means of transport, aggravated by the fact that the Austro-Hungarian common park of railway material has not yet been distributed.

The establishment of a direct system of rates with the sea-ports — particularly with Trieste, later on with Fiume and the ports of the North Sea and the Baltic (Antwerp, Hamburg, Bremen, Stettin, Danzig) — is a very complex undertaking.

The direct rates for Trieste, which have been already accepted by the States concerned, will only come into force on March 1st, 1921. Similar rates for the North Sea ports will come into force very shortly.

The policy of the Czecho-Slovak Railway Administration in regard to rates will further aim at facilitating as intensive an employment as possible of the navigable waterways by means of favourable rates, especially in the case of the Elbe, of the Vltava and of the Danube.

As has already been stated, after the Revolution the Austrian rates remained in force in Bohemia, Moravia and Silesia ; the Hungarian rates were maintained in Slovakia and in sub-Carpathian Russia.

These rates were, however, subsequently modified on several occasions, because the situation rendered any far-reaching and final regularisation of these rates impossible.

The deficit on the State railway made it necessary to double the rates ; in this way an appreciable step was made towards re-establishing the relation between the value of the goods transported and the rates charged in respect of them.

(a) *Passenger Rates.*

Rates in force on the former Austrian lines.

1913

Distance	Class		
	1st	2nd	3rd.
1 — 400 km.	9.0	5.5	3.5
401 — 600 km.	8.5	5.0	3.0
Above 600 km.	7.5	4.0	2.0
Excess for fast trains per km.	2.88	1.76	1.12

1918

	Ordinary Trains			Fast Trains		
	Class			Class		
Distance	1st	2nd	3rd	1st	2nd	3rd
1 — 250 km.	18.00	10.8	7.2	22.5	13.5	9.0
Above 250 km.	13.5	8.1	5.4	16.875	10.125	6.75

From July 1919.

	Ordinary Trains			Fast Trains		
	Class			Class		
Distance	1st	2nd	3rd	1st	2nd	3rd
1 — 250 km.	36.0	18.0	10.8	45.0	22.5	13.8
Above 251 km.	27.0	13.5	8.1	33.75	16.875	10.125

Rates in force on the former Hungarian lines till November 11th, 1917.

	Ordinary Trains			Fast Trains		
	Class			Class		
Distance	1st	2nd	3rd	1st	2nd	3rd
1 — 250 km.	18.48	10.64	5.95	26.18	15.4	10.64
251 — 300 km.	13.2	7.6	4.25	18.70	11.0	7.6
301 — 400 km.	5.28	3.04	1.70	7.08	4.4	3.04
401 — 800 km.	2.64	1.52	0.85	3.54	2.2	1.32

From July 1st, 1919.

	Ordinary Trains			Fast Trains		
	Class			Class		
Distance	1st	2nd	3rd	1st	2nd	3rd
1 — 250 km. . . .	36.96	18.48	10.64	52.36	26.18	15.04
251 — 300 km. . . .	26.4	13.2	7.6	37.40	18.70	11.0
301 — 400 km. . . .	10.56	5.28	3.4	14.16	7.08	4.4
401 — 500 km. . . .	5.28	2.64	1.52	7.08	3.54	2.2

All charges are reckoned in hellers per kilometre.

Luggage Rates.

Charges per unit of 10 kilograms per kilometre.

	1 — 300 km.	Above 300 km.	
In 1912.	0.40	0.30	All Trains
From February 1st, 1917	0.48	0.36	
From December 1st, 1917 . . .	0.72	0.54	
From July 1st, 1919	1.08	0.81	

Parcel Post.

Till the end of 1918: double the luggage charges.

From January 1st, 1919: four times the luggage charges.

When the rates were raised for the second time in June, 1920, the considerable differences between the charges for travellers and luggage in the Czech districts, in Slovakia, in sub-Carpathian Russia and in the territory of Hlutschin were abolished and the rates were made uniform.

In addition, a graduated scale has been introduced, in the first place according to distance:

From 1 km. to 250 km.
From 251 km. to 350 km.
Above 350 km.

next, by dividing the distances into zones:

From 1 km. to 50 km. a zone covers 2-3 km.
From 51 km to 100 km. a zone covers 5 km.
From 101 km. to 250 km. a zone covers 10 km.
From 251 km. to 300 km. a zone covers 25 km.
Above 351 km. a zone covers 50 km.

The charges made for third-class slow trains per passenger and per kilometer for distances up to :

250 km.	were	16	hellers
From 251 km. to 350 km.	»	12	»
» 351 »	»	6	»

The charge for second-class tickets is double that of third class and the charge for first class is double that of second-class.

The fare for fast trains is reckoned by adding a supplement to the fare for slow trains.

The third-class supplement for a fast train, for a distance of :

1 — 100 km. is : 8 Czecho-Slovak crowns
101 — 250 km. is : 12 » » »
251 — 500 km. is : 16 » » »
Above 500 km. is : 20 » » »

For luggage the charges are :

Up to 250 km.	1.8 hellers
And for greater distances	1.2 »

per kilometer and per 10 kilograms.

The charges are increased 50 % for the transport of luggage by express trains.

The rate for parcels in express trains is three times that of the rate for luggage.

(b) *Goods Rates.*

The necessity of a uniform scale of goods rates for the whole Czecho-Slovak Republic soon became apparent.

The unified scale for internal goods traffic will very shortly be published. There will be two scales in respect of the transport of goods by express ; the lower scale will specially apply to the transport of food-stuffs.

For transport by slow train eight different scales have been established according to the nature, price, volume, etc., of the goods.

In addition several special rates will be put into force.

The following tables show the rates for goods on slow trains travelling within the territory of the Republic during the periods indicated :

1. Goods of high value (1st class) ; quantity optional.
2. Goods of medium value (2nd class) ; quantity optional.
3. Goods of various kinds sent in quantities of 5,000 kgs and specified below.
4. Finished goods and various goods in quantities of 10,000 kgs.

5. Made-up produce and goods of various kinds of medium value and raw material sent in quantities of 10,000 kg.
6. Coal for internal consumption in quantities of 10,000 kg.

Goods of high value (1st class) in partially loaded wagons. Quantity optional.

Duty levied on 100 kg. and over (in hellers) per km.

	1. I.	28. X.	1. VII.	16. V.
	1912	1918	1919	1920
10	29	112	224	448
30	55	199	398	796
70	107	372	744	1,488
100	146	500	1,000	2,000
150	209	709	1,418	2,836
250	326	1,097	2,194	4,388
400	506	1,693	3,386	6,772

Goods of medium value (2nd class) in partially loaded wagons. Quantity optional.

Duty levied on 100 kg. and over (in hellers) per km.

	1. I.	28. X.	1. VII.	16 V.
	1912	1918	1919	1920
10	27	77	154	308
30	50	126	252	504
70	96	228	456	912
100	130	303	606	1,680
150	183	420	840	2,536
250	280	634	1,268	3,844
400	427	961	1,922	3,843

Goods of various kinds :

Asphalt, beer, lead, rolled iron, reaping hooks, scythes, agricultural machines, flour (Class A goods).

Transportation by slow train of weights exceeding 5,000 kg.
(per km.)

	1. I.	28. X.	1. VII.	16. V.
	1912	1918	1919	1920
10	22	58	116	232
30	38	93	186	372
70	70	163	326	652
100	94	218	436	872
150	129	294	588	1,176
250	192	433	866	1,732
400	285	369	1,278	2,556

Finished goods :

Cardboard roofing, clay and cement articles, etc., goods of various kinds, tar, hemp, flax, syrup, iron, etc. (Class B goods.)

Transport rates for 100 kg. and over (in hellers). (per km.)

	1. I. 1912	28. X. 1918	1. VII. 1919	16. V. 1920
10	18	49	98	196
30	31	78	156	312
70	55	131	262	524
100	74	173	346	692
150	100	229	458	916
250	145	330	660	1,320
400	208	469	938	1,876

Finished goods :

Small metal shavings, bricks, cement, plaster, fireproof clay, lime, firewood, building timber, fodder, litter, potatoes, beetroot, etc. ; finally, raw produce sent by slow train of more than 10,000 kg. in weight (Class C goods).

Transport rates for 100 kg. and over (in hellers). (per km.)

	1. I. 1912	28. X. 1918	1. VII. 1919	16. V. 1920
10	15	42	84	168
30	25	65	130	260
70	45	109	218	436
100	55	31	262	524
150	70	163	326	652
250	90	211	422	844
400	124	284	568	1,136

Coal :

For internal consumption sent in quantities of at least 10,000 kg.

Transport rates for 10 kg. and over (in hellers). (per km.)

	1. I. 1912	28. X. 1918	1. VII. 1919	16. V. 1920
10	15	41	82	205
30	24	60	120	300
70	39	90	180	450
100	48	105	210	525
150	61	129	258	645
250	77	160	320	800
400	103	209	418	1,045

Fuel.

The consumption of coal on the Czecho-Slovak railways in 1919 was 864,322 tons of coal and 2,277,878 tons of lignite; in 1920 of was 1,013,937 tons of coal and 3,460,132 tons of lignite.

The quantity of coal consumed per ton carried, which before the war was approximately equal to 130 kg., amounted after the war to 200 kg. and over. This difference is accounted for above all by the quality of the coal used, which leaves much to be desired. Before the war the national industries, especially in N. E. Bohemia and Moravia, were chiefly supplied with coal from Prussian Silesia. As the quantity of coal supplied by the Silesian mines has greatly diminished, it is now necessary to supply these industries, which for the most part cannot use coal of inferior quality, with the best national coal, and the rest has to be burned in railway engines, and this reduces their working capacity and causes damage to the boilers.

This state of affairs has a most unfavourable influence upon traffic and accentuates the existing shortage of locomotives.

Table number 6 indicates the provenance of the coal employed to-day by the Czecho-Slovak State Railways. It will be seen that almost two-thirds of the total amount consumed comes from the lignite basin in Northern Bohemia, the rest from the Ostrava-Karvin (Silesia of Tesin) from the basin of Falknov (North West Bohemia) and from smaller basins in the country. Only 0.6 % comes from Upper Silesia and 0,6 % from Lower Silesia.

TABLE N° 6.

Origin of the coal supplied to the Czecho-Slovak State Railways.

Basins :	Percentage :
(a) Lignite.	
Most-Duchcov (Northern Bohemia)	65.9
Falknov (North West Bohemia)	8.6
(b) Coal.	
Ostrava-Karvin (Silesia of Tesin)	14.7
Kladno (Central Bohemia)	3.7
Plzen (Western Bohemia)	2.9
Trutnov (North Eastern Bohemia)	1.5
Handlova (Slovakia)	1.2
Brno (Moravia)	0.3
Lower Silesia	0.6
Upper Silesia	0.6
Total	100.0

The price of coal has risen continually both during the war and since.

The price per ton in 1913 was 5.06 crowns for lignite and 14.05 crowns for coal. In 1919 the average price was 51.72 Czecho-Slovak crowns for lignite and 115.60 Czecho-Slovak crowns for coal. These prices rose in 1920 to 160 Czecho-Slovak crowns for lignite and 280 Czecho-Slovak crowns for coal.

Financial Situation.

In the preceeding paragraphs we have described in detail the difficult situation of the Czecho-Slovak railways at the moment of their surrender, and also the efforts made by the Czecho-Slovak administration for maintaining and improving the traffic, in spite of the unfavourable situation.

Naturally this state of affairs has had its effect on the financial situation of the system.

The depreciation of the old Austrian railways during the war is shown from the financial point of view by the low interest on the foundation capital (3 % before the war). This figure fell during the administrative years 1914, 1915 to 0.87 %, in 1916/17 to 0.17 % and in 1917/18 it disappeared altogether to be replaced by a deficit of about 110 millions; moreover the cost of military transport was shown as under the receipts without ever having been collected.

Thus the administration of the Czecho-Slovak railways took over a system the liabilities of which far exceeded the assets.

In order to maintain the operation of the lines it was obliged to undertake improvements without delay and proceed to considerable expenditure.

It was also necessary to revise the salaries of the staff, who were exhausted by the great length of the war and suffered from the unfavourable conditions of life.

The result is that the budget of the Czecho-Slovak railways is heavily burdened by the cost of repairs of constructional work and new rolling-stock on the one hand, and of increased salaries of staff on the other.

The total credit allocated for constructional work amounts to nearly 300,000,000 Czecho-Slovak crowns in the budget of 1919 and to about 1,350,000,000 Czecho-Slovak crowns in 1920, the programme of work being extended and the prices having increased during these years.

The figure representing allocations and bonuses for the cost of living granted to the staff of the railways amounted.

in 1919 Budget	. . . . .	to	291,900,000	Czecho-Slovak crowns.
in 1920 »	. . . . .	to	422,400,000	» »
in 1921 »	. . . . .	to	670,300,000	» »

It must be added that the number of employees per kilometre has slightly increased, but this increase is proportionately small (from 11.7 to 13 persons).

The total deficit in the budget of 1919 was 240,000,000 Czecho-Slovak crowns and in the 1920 budget this amount increased to 625,000,000 Czecho-Slovak crowns. These two figures include the cost of new constructions ; the extra bonuses to the staff have been included in another budget common to all the ministries.

The 1921 budget presents a slightly more favourable aspect and shows a surplus of 265,000,000 Czecho-Slovak crowns. This budget includes bonuses, but the cost of new constructional work, which will increase the value of the railway, was allowed for in a special budget which is to be covered by a loan.

These budgetary figures do not include interest and amortisation of the foundation capital, which has not yet been fixed by the Reparations Commission.

Final results, obtainable for 1919 only (see Table 7), confirm the outline we have given here. They are more favourable than the figures estimated in the budget and decreased the estimated deficit of 114,000,000 crowns.

TABLE NO. 7.

Revenue and Expenditure of the Czecho-Slovak Railways in **1919**.

Working Revenue		Sundry and Extraordinary Revenue		Total Revenue	
Czecho-Slovak crowns	hellers	Czecho-Slovak crowns	hellers	Czecho-Slovak crowns	hellers
1,119,245,915	34	82,975,408	04	1,212,221,323	47

Working Expenditure		Extraordinary Expenditure		Establishment Expenditure		Total Expenditure	
Czecho-Slovak crowns	hellers	Czecho-Slovak crowns	hellers	Czecho-Slovak crowns	hellers	Czecho-Slovak crowns	hellers
974,330,048	34	43,145,731	09	329,987,299	53	1,347,465,078	96

As soon as the constructional work necessitated by the abnormal wear and tear during the war and the adaptation to new requirements has been completed, there is reason to expect continuous improvement in the financial situation of the Czecho-Slovak railways unless the system is valued at too high a figure by the Reparations Commission.

II.

INLAND NAVIGATION.

The territory of the Czecho-Slovak Republic is situated on the waterparting of the Central European waters which flow to the North Sea, the Baltic, and the Black Sea. The Elbe, the Oder and the tributaries of the Danube have their sources in the valleys of Bohemia. The volume and in consequence the navigability of these water-courses depends to a great extent upon the manner in which the Czecho-Slovak Republic will exploit this great wealth of water. This fact is of great importance for the sections of rivers declared international by the Peace Treaties, viz, the Elbe, the Vltava below Prague, the Oder below its confluence with the Opava, the Danube below Devin, the Tissa below Tiszabecs, and the Morava below its confluence with Dyje (Thaya), together with its internationalised tributary in the portion which forms the frontier between Czecho-Slovakia and Austria.

Material.

I. *Condition of the Waterways.*

Czecho-Slovakia possesses the following waterways:

(1) The section of the middle Vltava from Budejovice to Prague (190 kilometres).

(2) The international section of the Vltava from Prague to Melnik and the international section of the Elbe from Melnik to the Czecho-German frontier (158.4 km.).

(3) The middle Elbe from Jaromer to Melnik (223 km.).

(4) The portion of the Danube between Devin and the mouth of the Ipola (172 km.).

(5) The portion of the Oder between its confluence with the Opava and the German frontier (17.7 km.).

Grand total 761.1 kilometres.

1. *The Middle Vltava from Budejovice to Prague.*—The middle Vltava between Budejovice and Prague has long been navigable. As early as the 14th century the Emperor Charles IV endeavoured to improve its navigability, and it became the principal navigable river in the South of Bohemia for the transportation of timber. It served the same purpose for boats which chiefly carried salt from Salzburg in Bohemia; later on, this route was put in connection with the first railway with animal traction from Budejovice to Linz, which was established at the beginning of the 19th century.

Although the Vienna-Prague railway, which was built in 1869, was a serious competitor with this waterway, the annual transportation amounted in 1902 to 800,000 tons, of which 500,000 tons was timber.

The valley of the Vltava, which has cut its bed through the mountain range, is distinguished by the beauty of its scenery, but numerous rapids and the unequal depth of the water (averaging 100 cm. per kilometre) cause numerous difficulties to navigation. The State administration has made constant efforts to surmount these difficulties and at periods of mean water level navigation is carried on by means of shallow barges which go right into Germany.

The idea of uniting the Vltava to the Danube by a canal which dates from the 14th century was taken up again in 1890. As a result of a competition the following plans were considered: a scheme for a canal from Budejovice-Gmund-Vienna, and another scheme for the canalisation of the Vltava from Budejovice to Melnik for vessels of 600 tons with 33 locks and 8 tunnels.

The character of the middle Vltava and the fact that its valley is little inhabited—which makes it possible to raise the water level considerably—have given rise to a new plan for a canal from Budejovice to Prague, with 20 weirs 4 to 20 metres in height. It is proposed to employ hydraulic power of about 60,000 h. p.

This scheme has recently been supplemented by proposals of other works intended to retain the surplus of water in the valley itself in 11 reservoirs, of which 7 were formed by powerful dams 35 metres in height and retaining 165 million cubic metres. The river would thus be made navigable for vessels of 1,200 tons. The use of the hydraulic power would be increased to 100,000 h.p. and the level of floods in the lower section of the Vltava and the Elbe would be lowered by several metres by means of reservoirs to be established on the Berounka and in the Sumava. The execution of this scheme would have a favourable influence on the navigability of the international portion of the Vltava and the Elbe even into Germany, where, in months of great drought, navigation is constantly interrupted.

2. *The International Section of the Vltava from Prague to Melnik* is a continuation of the Middle Vltava, and is made navigable for vessels of 600 to 1,000 tons by its canalisation which was begun in 1897 and has just been finished. Two fixed dams and 5 dams with switches and sluices form 7 reservoirs, having a minimum depth of 2.1 metres, equipped with two sorts of lock, one 11 metres in width and 73 metres long, the other 11 metres wide and 225 metres long with falls varying from 1.75 to 8.9 metres. The building of the hydro-electric works is now being proceeded with.

In the section Vranany-Horin, a lateral canal 10 km. long has been constructed.

The Vltava at Prague.—The most difficult question was to provide for the navigability of the section passing through the town of Prague; it was necessary in fact to purchase 31 hydraulic power factories; on the other hand it was desired to preserve intact the beautiful panorama of Prague, and this required the maintenance of reaches formed by fixed dams. The work for this purpose has been completed during the present year.

The International Section of the Elbe from Melnik to the German frontier. — The Prague-Melnik section has been used for navigation since the Middle Ages, but its small volume of water caused great difficulties during certain periods. It is only below Melnik, where the confluence of the Vltava and the Middle Elbe form the Great Elbe, that navigation is possible as far as Hamburg. Freedom of navigation has been guaranteed for centuries by numerous State agreements, particularly by the Elbe Agreement of 1821, and more recently by the Treaty of Versailles.

The navigability of the river and the proximity of the coalfields of North-Western Bohemia favoured the development of numerous industrial establishments in the valley of the Elbe, and this river became an important artery for the exports and imports of the old Austria towards the North Sea. For this reason the State administration, in the years 1870-78, bought up all the weirs and improved the river by a system of longitudinal dykes, with the result that a depth of 1.8 metres during normal water level was attained in the section between Usti and the Czecho-Saxon frontier. In 1897 it was decided to canalise the Melnik-Usti section, to obtain a uniform depth of 2.10 metres for vessels drawing 1.80 metres ; this was done on the Melnik-Lovosice section by means of 5 reservoirs with two sorts of locks 11 and 13 metres in width, and 75 and 225 metres in length respectively.

The construction of the largest reservoir neat Strekov, with a fall of about 6 metres, and of a generating station with a capacity of 16,000 h.p. is at present contemplated and will be completed in about 4 years. The whole of this section is navigable even now as far as Prague for vessels of 1,000 tons.

The navigability of the river in the section from Strekov to the frontier is better than in certain sections downstream.

The section from Lovosice to the Czecho-Saxon frontier is provided with a towing chain.

3. *The Middle Elbe from Jaromer to Melnik.*—The Middle Elbe from Jaromer to Melnik forms a continuation of the Hamburg-Melnik international waterway towards the east of Bohemia. The Vltava is torrential in character with a volume of 50 to 4,500 cubic metres a second, but the Middle Elbe is in the nature of a flat river with a volume of 30 to 1,100 cub. metres per second, and a gradient of 35 cm. per kilometre. It flows through a very fertile level valley, which is subject to inundation over a width of 3 km. There are many towns in the valley, in which the sugar industry is particularly developed ; for this reason the law of 1901 (regarding waterways) provided for the regularisation and canalisation of this stream so as to enable it to carry vessels of 600 to 1,000 tons. Works for this purpose have been in process of execution since 1904. A quarter of the distance has been improved ; two reservoirs near Melnik and Obristvi have been

completely re-built, four others at Lobkovice, Nymburk, Podebrady and Kolin are in course of construction; a section 12 km. in length is thus already accessible above Melnik to vessels of 1,000 tons. A new bed will be dug for mean and high water levels (150 to 750 cub. m. per second); the distance will thus be shortened by 223 to 180 km., and 20 fixed dams will be replaced by movable dams (cylindrical sluices, bridge or segment pattern) retaining the water in the Melnik-Jaromer section in 32 reaches with a total fall of 94.2 m. (A regular scheme of irrigation is planned for the whole of the territory exposed to floods over an area of 20,000 sq. km.) On this section it will be possible to utilise hydraulic power of 30,000 h. p. The low pressure hydro-electric stations will be joined to the steam generating stations of north east and north west Bohemia and to the system of high-power stations of the Vltava.

These works have, of course, been delayed by the war, but the Government of the Czecho-Slovak Republic is expediting them so that within a more or less limited time the control and canalisation of the river may be completed at least as far as Pardubice, and traffic with vessels of 1,000 tons may become possible.

4. *The International Danube from Devin to Soba.*—By virtue of the provisions of the Peace Treaties, Czecho-Slovakia has become one of the riparian States of the Danube, which gives her the possibility of direct economic relations by water with South-Eastern Europe and the Black Sea.

In the Devin-Soba section the course of the Danube is not of a uniform character. From Devin to Gonyü it is still in a measure torrential, sweeping down a great deal of gravel, and its average fall is 37 cm. per km. Below Gonyü the watercourse assumes the character of a river of the plain, and its fall is suddenly reduced to 10 cm. per km.; this is the beginning of the Middle Danube.

The normal width of the river is 300 metres at the mouth of the Morava near Devin; below the mouth of the Vah it is 450 metres; below Gonyü, the river is navigable for boats drawing 2 ½ metres; above Gonyü, during periods of low water, constant dredging is necessary to ensure sufficient depth for navigation.

In the portion of the Danube along the Czecho-Slovak frontier, preparations are made to deal with high and mean water levels by means of parallel dykes and the closing of numerous branches. The regularisation of the stream at low water by means of submerged dykes combined with longitudinal dykes, which was commenced by the former Hungarian Government, will have to be completed.

The depth of this section is in general 2 metres, except over the shallows, where it falls on an average to 1.2 to 1.4 metres.

The Czecho-Slovak Republic has set up two offices at Bratislava and Komarno which are at work on a scheme for the systematic completion and improvement of the river at low water. Meanwhile dredging is carried on in the shallows by means of dredgers which the Czecho-Slovak authorities have procured through the International Danube Commission. In addition the present administration is executing the repairs which were neglected during the war. For this purpose the State Administration has raised the credits for these operations from 120,000 crowns, (the sum fixed before the war) to 3,500,000 Czecho-Slovak crowns for the year 1921 ; and it will commence systematic work as soon as the International Danube Commission has determined the degree of navigability to be attained, and has approved the various plans.

Tributaries of the Danube.—To carry out this scheme it will be necessary to take count of the principal tributaries of the Danube ; these are the Morava, the Vah, the Nitra, the Hron, and the Tissa.

The Morava, which is being regularised at great cost in the interior of Moravia, has not yet been regularised in its lower portion where it forms the frontier between the Czecho-Slovak and Austrian Republics. The works undertaken in 1906 have been delayed by the war ; the plan for the regularisation of this river will have, moreover, to be carefully reviewed to meet the requirements of the neighbouring States.

The international portion of the Marava is only accessible to small barges and rafts.

On the other tributaries of the Danube there is very important traffic in timber rafts coming from the Carpathian forests. Only a portion of the Vah, about 20 km. above its confluence with the Danube, is navigable for vessels.

The Tissa is navigable below Tisa-Becs.

The Government of the Czecho-Slovak Republic will naturally endeavour not only to maintain the present state of navigability, but also to undertake the canalisation of the Vah from its mouth up to Zilina, and the canalisation of the Hron as far as Zvolen. The same applies to the improvement of the Tissa in the part of its course flowing through Czecho-Slovak territory.

5. *The Oder.*—The internationalised section of the Oder, which flows for 17.7 km. through Czecho-Slovakia, has a depth of 1 ½ metres and a width of 50 to 60 metres, and a fall of 0.6 metres per km. Further downstream, where it flows through Lower Silesia (22.6 km), the Oder is navigable for small rafts as far as Ratibor ; and from there is navigable for boats and tugs. From Kosel the Oder is already canalised for barges with a draught of 1.70 km. and a capacity of 500 tons. The Czecho-Slovak administration intends to canalise the portion traversing its territory if Germany decides to continue the canalisation of the Oder above Kosel as far as the Czecho-Slovak frontier (64 km.).

In this way direct communication by water will be established for the Czecho-Slovak Republic, with the port of Stettin, where, in accordance with the Treaty of Versailles, a free zone has been reserved for it.

6. *Schemes for Canals.*—The law of June 11th, 1901, already quoted, provided for the construction of the following canals :

(1) Canal connecting the Elbe and the Danube, with branch to the Oder and the Vistula;

(2) Canal connecting the Vltava with the Danube;

A scheme has recently been discussed for a canal connecting the Vltava, Berounka, Maine and Rhine.

By the above-mentioned law regarding waterways, which was dictated primarily by political reasons, the former Austrian Government endeavoured in the first place to secure advantageous transportation for the coal from the mining district of Ostrava to Vienna. For this reason it drew up the scheme for the Danube-Oder canal Vienna to Moravska-Ostrava, part of the land for which was purchased. As regards the other canals, only preliminary investigations were undertaken. Nevertheless, Bohemia succeeded in having the work of canalising the Elbe and the middle Vltava at Prague begun at the same time, operations forming part of the general programme contemplated by the law.

Canal between the Elbe and the Danube.—Owing to the new circumstances caused by the change of the political regime, the Czecho-Slovak Republic is now greatly interested in connecting the Elbe with the Danube via Pardubice-Prerov-Devin, with a branch to the Oder near Oppeln, and to the Vistula near Cracow. For this reason the administrative authorities of the Republic, immediately after the change of regime, began to plan a canal from Pardubice on the Elbe to Prerov on the Marava, and undertook to modify the plan of the canal from the Danube to the Oder, the Prerov-Vienne section of which had already been planned in detail by the former Austrian Government.

The proposed canal would have a total length of 325 km.

There will be 47 locks for vessels of 670 tons, allowing for a volume of traffic up to 10 million tons per annum. It has been decided to keep the branch of the canal from Prerov to the Oder.

Canal from the Vltava to the Danube.—Two different schemes have been advanced for the canal from the Vltava to the Danube—the scheme proposed by the Committee on the Vltava-Danube canal, the line of which passes from Budejovice via Gmund to Korneuburg (near Vienne), and the plan for a canal from Budejovice or from Vyssi Brod to Linz, which involves the use of mechanical elevators.

As the interests of Czecho-Slovakia require that the canal connecting the Elbe with the Danube should cross as much as possible of its territory, the Government has decided first of all to proceed with the plan of a canal from the Elbe to the Danube from Pardubice to Devin, as this would seem to be most advantageous for international commerce and would present least technical difficulties in construction. The scheme to connect the Vltava with the Danube has accordingly been postponed until the middle Vltava has been canalised.

A scheme has recently been discussed for a third canal connecting Czecho-Slovakia with the western States via the Vltava and the Berounka, through the Seruby pass, Bavaria and so to the Rhine and the Danube.

II.—*Condition of Ports.*

Ports and Transhipment Stations on the Vltava.—After the enactment of the Elbe Act in 1821, by which freedom of navigation was secured, navigation rapidly developed, so that the necessity for ports became urgent. In 1822 the Prague Sailing Navigation Company (Prager Segelschiffahrtgesellschaft) established a port at *Karlin* (suburb of Prague). Towards 1890 this port was rebuilt by the State and provided with wharves and a travelling crane. At present it has an average width of 32 metres, a length of 500 m. and a depth of 1.80 m., and will hold 20 Elbe vessels. After the War the Czecho-Slovak Administration equipped it with three electric cranes.

In 1892 and 1894 the State built at *Holesovice* (Prague VII) a wintering and refuge harbour capable of sheltering 80 Elbe barges. In consequence of the canalisation of the Vltava below Prague, the port was deepened to 2.10 m., connected with the railway and provided with the requisite cranes; it has thus been transformed into a commercial port. At the same time the Commune of Liben (Prague VIII) built the port of Liben which shelters 20 Elbe vessels.

In 1868 the State constructed, above Prague, the port of Podoli (suburb of Prague) as a harbour of refuge, and in 1900 it also constructed at Smichov (suburb of Prague) a harbour for rafts with a transhipment station 1 ½ km. long, connected with the State Railway. The importance of this will soon become evident in view of the fact that the canalisation of the Vltava in Prague has now been completed.

On the rest of the course of the Vltava below Prague special mention must be made of the transhipment station at Kralupy, which is connected with the railway from Bûstêhrad.

Ports and Transhipment Stations on the Elbe.—At the confluence of the Elbe and the Vltava stands the port of Melnik, which is connected with the railway and provided with a crane installed after the war.

Most of the ports, however, are grouped on the great Elbe near the German frontier.

The Commission of Revision, established in 1821 under the Elbe Act, afterwards recommended the construction in Bohemia of winter ports on the Elbe. The installation of landing stages, stations and stopping places on the Elbe began in 1850; it was chiefly the railway companies who constructed, at various points of the river and at their own expense, a large number of paved embankments and masonry quays. These works, which were intended for transhipment, were increased in proportion to the development of traffic. Towards 1857 docks of this kind were constructed by the State at Rozbolesy and Lovosice. The first of these, which now measures 89,300 sq. m., is situated next to a great unloading quay, which is connected with the Duchov-Podmokly Railway.

The port of Lovosice was soon abandoned and is no longer used. On the other hand, the canal below the lock-derivation at Lovosice was improved ; rails were laid there in 1914, and it was connected with the State Railway. During the war it was much used for the transhipment of goods and part of the coal for the City of Prague. In 1912 the transhipment station was built at Litomerice ; this will be connected with the North-Eastern Railway.

At Usti (Aussig) there are two harbours ; the first, built by the Usti-Teplice Railway Company in the years 1864 to 1867, now has an area of 43,700 sq. m. The second harbour, 49,700 sq. m., was built there in the years 1889 to 1891. Both are connected by the Usti-Teplice Railway with the lignite basin and industrial region in the North-east of Bohemia. The same railway is connected below Usti with great unloading stations of a total length of 4,500 m., where, before the war, 1,000 to 1,200 10-ton trucks of coal were transhipped daily. Mention must also be made of another unloading station above Usti, 450 m. long, provided with wharves and the necessary equipment for the transhipment of goods in small quantities. At Krasne-Brezo, above Usti, a transhipment station has also been established, 870 m. long.

In 1866 a port was built near Dêcin (Teschen) which in 1869 was provided with a high quay and connected with the Northern Railway.

The most important transhipment-station on this part of the Elbe is at Loubi (Laube), with a length of 3 km., situated below Decin and connected with the North-Eastern State Railway.

During the war the ports of the Vltava and the Elbe and their wharves were congested with traffic, while no attention was paid to their normal up-keep. Moreover they have no modern equipment, so that they by no means satisfy present requirements. The existing installations must be modernised, especially in the ports of Loubi and Decin, and the ports of Central Bohemia must be provided with the machinery necessary to cope with the requirements of navigation, which is continually increasing.

Schemes for Harbours of Refuge and Winter-Harbours.—Between Prague and the German frontier there are, in a stretch of 158 km., three ports of refuge—at Prague, Usti and Rozbelesy. The distance from Prague to Usti is 120 km. and it has been decided to establish a new port near Melnik, 50 km. below Prague. This port will provisionally consist of a dock 530 m. long and 80 m. wide and will hold 60 vessels ; its construction is to be begun in the course of the present year. Provision is made for enlarging this port by a second dock.

To relieve congestion at the ports of Usti and Rozbelesi it will probably be necessary to construct another winter port near Rasseln for 20 vessels. The plans for this work were already drawn up by the former State Administration.

Scheme for a large Port at Prague.—Prague being the capital of the State and also the terminus of the navigable waterway connecting the city with the North Sea, a large port and a central goods station on the river bank must be established there, in order to cope with future traffic needs. Under the plan recently drawn up, these will be built in the town, on ground hitherto subject to inundation, with a surface area of about 800,000 square metres, which has been reclaimed by shifting the bed of the Vltava.

The scheme includes a customs port 430 metres long, 37,000 sq. metres of warehouses, a coal dock 800 metres long, with depots covering an area of 52,000 square metres ; a heavy-goods dock 500 metres long with 25,000 square metres of warehouses ; also the harbour of Karlin, 900 metres long and 7,700 square metres in area with a capacity of 10 vessels. All these docks are 50 metres wide and 25 metres deep. A ship-building yard would also be established.

The goods station will include a warehouse for retail goods, a custom house and a coal station connected with the coal port.

Further, it is proposed to establish transhipment-stations of a total length of 3,300 metres, some of which will be particularly designed for unloading petrol products and building materials.

The total cost of constructing the port will amount to 82 million Czecho-Slovak crowns ; this would be covered for the most part by the value of the ground thus reclaimed or improved, which to-day is subject to inundation.

Ports on the Danube.—In the former Hungarian Kingdom, ports now situated on Czecho-Slovak territory were for the most part only of local importance, serving only the adjoining Slovak territory. These ports were Bratislava, Komarno and Parkan.

Towards the end of 1918, the port of *Bratislava* consisted of unloading-stations situated on the left bank of the Danube and with an available length of 1,500 metres. There were three sheds belonging to the Danube Navigation Company (D. D. S. G.) and two masonry storehouses belonging to the Hungarian Maritime and River Navigation Company (M. F. T. R.). Moreover coal depots had been erected to provide for the needs of these two navigation companies. A railway has been installed along the quay and is connected with four shunting lines. It was only during the war that unloading by hand was replaced by a travelling bridge crane with a capacity of 30 wagon-loads per day, intended principally for handling war material.

Besides these unloading-stations properly so called, a winter port was established in 1904, composed of 2 basins with an average width of 90 and 140 metres and a length of 700 and 600 metres respectively, with a total capacity for 250 barges.

The port of *Komarno* was built on the left bank of the Danube in a secondary branch protected by a dyke against the river at average water level. It also serves as a winter port with a capacity of about 300 vessels. Its banks are strengthened by stone paving supported by an enrockment. It contains 4 private warehouses with a total capacity of 160 wagon loads, and a line of railway connects it with the Nové Komarna station. Transhipment is carried on entirely by hand.

The port of *Parkan* was entirely local in character. It had no plant and was not even connected with a railway.

The creation of the Czecho-Slovak Republic invested these ports with new importance, and they are destined to become centres of extensive trade with Hungary, the Balkans, South Russia, Asia Minor and all the other countries of the East and South.

At Devin, a town situated at the mouth of the Morava and of the future canal connecting the Elbe and the Danube, it is proposed to construct a port for heavy goods such as coal, ore, etc. The principal mercantile port of the Danube will naturally be at Bratislava. Komarno will be of less importance. Finally an industrial port will probably be established at Parkan. All these ports will be connected with each other by a double-track railway, in order that smooth working and a maximum output may be assured by a prompt and efficient distribution of the goods in each of these three ports. The connection of these ports with all parts of the State territory is already assured by two double-track lines of railway.

When all these schemes have been carried out, an output of 3 million tons per year may be expected from the port of Bratislava, while that of Kamarno is only estimated at one million tons. The port of Devin will be built subsequently.

The execution of this programme, to which five years will be devoted, will involve expenditure estimated at 225 million Czecho-Slovak crowns for the port of Bratislava, and 190 million Czecho-Slovak crowns for Komarno.

III.—*Condition of the Fleet.*

The Vltava and the Elbe.—The former Austrian State endeavoured, by favourable rates and subsidies granted to transportation enterprises, to direct its foreign traffic to Trieste, which was its only seaport. This policy and the prolonged rate-war between the navigation companies of the Elbe, resulted in arresting the development of navigation on the Elbe, which at first had been very active. The navigation companies and the private owners in Bohemia therefore endeavoured to unite with the companies of Germany, where inland navigation found ready support from the Government ; in this they finally succeeded. Consequently, no navigation company of any importance remained on the territory of old Austria, although the transport of Czech products accounted, before the war, for 33 % of the total transport on the Elbe.

As a result, there is very little shipping belonging to Czecho-Slovak subjects.

The following table shows the present state of river shipping on the Vltava and Elbe as registered in Czecho-Slovakia.

Owners	Steamers	Barges	
		Number	Tonnage
Private Owners	—	72	30,650 tons
Sugar Factories	—	16	4,340 ,,
Barges belonging to private owners and to the Municipality of Prague	—	29	2,810 ,,
North-Western Navigation Company of Vienna	15 tugs 9 towing boats	114	78,880 ,,
Vltava & Elbe Tonnage Company	14 tugs	—	—
Building Society A. Lanna Share Company	6 tugs [1]	—	—
Prague Navigation Co. (for passenger traffic)	7 ships carrying 800 passengers 14 ships carrying 100-200 passengers	—	—
Total	65	231	116,680 tons

Danube Flotilla.—Already, before the war, Czech trade towards the East and South-East made use of the Danube. It was in particular the ports of Vienna, Linz and Ratisbon which received and despatched goods from Bohemia, Moravia and Silesia. Budapest was the principal shipping centre for Slovakia. The goods were carried by the Bavarian, Austrian and Hungarian navigation companies.

After the war, Czecho-Slovakia took her place among the Danube riparian States. As, however, she has at present no national flotilla, she has to make use of boats hired from "The First Danube Navigation Company" of Vienna, (5 tugs of 500-1,000 h. p., 41 barges of 300-700 tons and 4 tank boats), and from the "Serbian Navigation Syndicate" of Belgrade (4 tugs and 24 barges). In addition, use is made of 20 lighters belonging to the Hungarian Company (M. F. T. R) repaired in the shipyards at Komarno.

The Republic of Czecho-Slovakia expects that part of the Danube flotilla will be allotted to it under Article 300 of the Treaty of Saint-Germain and similar articles in the other treaties of peace. Pending the decision of the American arbiter on this matter, new ships are being built.

Oder Flotilla.—The former Austrian Empire did not make use of its own shipping for transportation on the Oder, although it accounted for 18 % of the total traffic on this river. All the boats on the Oder belonged to German subjects[1]. It has not been possible to make any change in this state of affairs up to the present.

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[1] Only used for transporting building materials.

Traffic.

I.—*Navigation Service.*

Vltava and Elbe.—The Navigation companies and private navigation enterprises which take part in the Czecho-Slovak traffic on the Vltava and Elbe may be divided into two groups.

1. *Czecho-Slovak Navigation Firms:*

(a) The Prague Vltava and Elbe Navigation Company exclusively engaged in local passenger traffic on the Vltava in the neighbourhood of Prague and between Prague and Melnik.
(b) Elbe and Vltava Towage Company at Prague.
(c) Small private owners and two sugar factories.

2. *German Firms:*

There are several German Navigation Companies possessing 183 tugs and 1274 larges including:

The Austrian North-West Steamship Company of Vienna.
The United Elbe Shipping Company.
The German-Austrian Steamship Company of Magdeburg.
The New German-Bohemian Elbe Steamship Company of Dresden.
The Saxon-Bohemian Steamship Company of Dresden.

In addition to these companies, several thousand private German owners took port in the Czecho-Slovak traffic.

Danube.—There is as yet no Czecho-Slovak navigation company on the Danube. It was the State Authorities themselves who in 1919 established at Bratislava the Czecho-Slovak Danubian Navigation Office (Czechoslovensky dunejsky dopravni urad) which carries on transport on the Danube with boats hired from foreign navigation companies.

II.—*Passenger Traffic.*

It is very difficult to give precise statistics for the development of traffic in Czecho-Slovakia, because inland navigation only began after the war, and could not develop owing to the lack of national shipping.

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[1] According to official statistics, there were in all on the Oder 350 tugs, and about 4,400 barges, all registered in different German ports, with a total tonnage of 1,200,000 tons.

For the same reasons it is impossible to give precise information for the years 1919 and 1920.

The Vltava and Elbe.—Before the war, the Czecho-Saxon Navigation Company carried passengers on the Elbe, between Litomerics (Leitmeritz) and Dresden (65 kilometres of this route are in Czecho-Slovakia). This Company carried:

In 1913	2,808,695	passengers
In 1914	1,754,488	»
In 1915	1,375,035	»
In 1916	1,364,587	»
In 1917	1,194,619	»
In 1918	1,324,304	»

and at the same time its passenger ships carried luggage amounting to 13,287 tons in 1917 and 14,149 tons in 1918.

The Prague Navigation Company's passenger traffic on the Vltava, between Prague and Stechovice, was as follows:

In 1918	1,141,509	passengers
In 1919	1,864,120	»
In 1920	2,094,840	»

The Danube.—Two foreign companies, one Austrian (D. D. S. G.) and one Hungarian (M. F. T. R.) are responsible for the passenger traffic on the Danube between the Czecho-Slovak ports.

III.—*Tonnage of Goods.*

The Vltava and Elbe.—Goods traffic on the Elbe and Vltava (between Prague and Hamburg) during the five years from 1909 to 1913 is shown by the following figures:

Year.	Inland Traffic.		Foreign Trade.		Total Traffic in Tons.
	Vltava.	Elbe.	Imports.	Exports.	
1909	141,000	207,000	717,000	2,632,000	3,697,000
1910	122,000	290,000	702,000	2,411,000	3,535,000
1911	128,000	233,000	575,000	1,626,000	2,562,000
1912	99,000	225,000	881,000	2,403,000	3,608,000
1913	110,000	236,000	783,000	2,358,000	3,487,000

No exact information is yet to hand for the post-war period. For 1920 the statistical bureau estimates the total traffic on the Elbe in Czecho-Slovakia at one million tons. The decrease is explained by the general post-war economic situation, and should be considered as temporary.

The Danube.—Statistics concerning pre-war traffic on the Danube are even more difficult to obtain than in the case of the Elbe; accurate information as to the goods traffic is wanting.

Before the war, goods traffic in the port of Bratislava was estimated at an average of 30,000 tons per year. As regards the port of Komarno, we have no information, even approximate, concerning its traffic.

After the war, from October 15th to December 31st, 1919, traffic in the port of Bratislava amounted to 22,167 tons, of which 16,210 tons were handled by the Czecho-Slovak Danubian Navigation Office. In 1920 the total traffic in this port reached 160,796 tons, half of which was handled by the same office. The goods traffic in the port of Komarno was very small: 3,388 tons from the 15th October to the 31st December, 1919. In 1920, however, it reached 31,400 tons.

Oder.—Navigation on the Oder is of importance to the Republic of Czecho-Slovakia, as it affords a means of communication with the Baltic States. The principal traffic down the Oder was in iron and ironwork from the blast furnaces in the Ostrova-Karvin district. Upstream, the cargoes generally carried were ore from Sweden, shipped to the blast furnaces at Vitkovice, and sea-fish, raw hides etc.

Before the war, imports from Sweden amounted to 800,000 tons, the greater part of which were brought from Stettin by the Oder as far as Kosel, and thence by rail. Prior to the war Czecho-Slovakia was responsible for 18 % of the total traffic.

Fuel.

All vessels in use on the Elbe and the Danube use coal as fuel. The distribution of coal is still under State control. The responsible department of the Ministry of Public Works allots 15,150 tons per month of lignite from the coal district of Northern Bohemia for Czecho-Slovak transport on the Elbe; and 5,000 tons per month of coal from Morovska Ostrava for use on the Danube at a cost of 18 Czecho-Slovak crowns for lignite and 48 crowns for ordinary coal per 100 kilogs delivered at the mine. As far as is possible, and on special request, coal is also furnished for other transportation purposes at the export price. It is true that the quantity of coal delivered up to the present has not sufficed to meet the demand, but the present output of coal did not permit a large supply.

III.

MARITIME NAVIGATION.

Maritime Ports.—In accordance with Article 363 of the Treaty of Versailles Germany will lease to the Czecho-Slovak State, for a period of 99 years, sites in the ports of Hamburg and Stettin, which will be placed under the general régime of free zones and will be set apart for the direct transit of goods coming from or going to Czecho-Slovakia.

The negotiations between the Czecho-Slovak Government and the German Government with regard to the free zones in these ports will be entered upon shortly. Meanwhile Czecho-Slovak traffic, for which at present no national maritime fleet is available, is temporarily utilising such plant as is generally accessible in the ports of Hamburg and Stettin.

Besides these two free zones for northern maritime traffic, the Czecho-Slovak State is greatly interested in the traffic on the Adriatic Sea, railway communication with which has been assured to her by the Treaties of Peace. Trieste is the outlet for part of her traffic with the Far East. For this reason the Czecho-Slovak Government, by a Treaty of November 1920 concluded with the Italian Government, has obtained the use of sheds and plant for transhipment in the port of Trieste, and also of coal depots and other facilities for direct transit.

Moreover the Czecho-Slovak Republic will take all necessary measures to inaugurate maritime trade on the Black Sea and thus to secure communications with the countries on its coasts, countries with which her inhabitants maintained close commercial relations before the war.

Maritime Fleet.—At present the only sea-going ship under the Czecho-Slovak flag is the *Legie* (Legion), which trades with the Far East. Prague is its port of registration, and Trieste its port d'attache. This ship has a tonnage of 8,000 tons and is the property of the "Bank of the Czecho-Slovak Legionaries."

IV.

MOTOR AND AIR TRANSPORT.

There are about 5,000 motor-cars of all kinds in Czecho-Slovakia. There was very little carriage of goods by motor before the war it is only since the war that this form of transport has begun to develop. Up to the present passenger motor-traffic is confined to the richer classes, owing to the excessive price of motor-cars and of the materials necessary for their upkeep.

Motor-omnibus transport is also beginning to develop. At present the Ministry of Posts and Telegraphs make the principal use of this form of transport. In the middle of 1920, 23 lines, covering 627 kilometres in all, were being worked.

⁂

In 1920, the Air Service Prague-Paris (about 900 km) was established. This service is maintained by "The Franco-Roumanian Aerial Navigation Company", subsidised by the State, which built the aerodrome at Kbely (near Prague) and equipped the one at Cheb (Eger). Transport was started in September 1920 but had to be interrupted during the winter. The regular service will be resumed in March or April 1921. The time needed to fly from Prague to Paris or vice-versa is from 5½ to 6 hours.

During the course of 1921, services will be established between Prague and Warsaw (about 500 km.), also under the management of the Franco-Roumanian Company. Preliminary work on this route has already begun.

In addition, the establishment of air services from Prague to Berlin, Prague to Vienna, and a home service from Prague to Bratislava and Kosice is being considered.

DENMARK.

I.

RAILWAYS.

The following table gives particulars with regard to both the State and private railways. As regards private railways, it should be added that the consumption of coal on these lines will amount to approximately 110,000 – 115,000 tons per year. In 1920 about 80,000 tons of coal and about 23,000 tons of peat were consumed, the latter amount being equivalent to about 10,000 tons of coal. It should also be observed with regard to the private railways that the net results have been very unsatisfactory during the last few years.

II.

MARITIME AND WATERWAY NAVIGATION.

As regards the Maritime and Waterway Navigation, it should be pointed out, under the heading " Material ", that the Danish ports are in as good condition as before the war, and that important works have been carried out during the war for enlarging and deepening them.

In the port of Copenhagen, the length of quays at the beginning of the war amounted to 28,200 metres ; by the end of 1921 this distance will have been increased by 6,395 metres.

The distance across the port from the entrance at Trekroner to the lock at Kalvebo Strand is 8,4 km., and the distance between the northern and southern boundaries of the port is 13 km.

The area covered by goods-depots in the Free Harbour amounted before the war to about 120,000 square metres ; at present it is about 160,000 square metres.

In the Customs Harbour new goods-depots have also been built during the war, but these are private property.

⁂

As regards freights, these have conformed to the general tendency of rates all over the world.

The condition of maritime navigation was satisfactory during the war ; but, as in all other countries, there is, at present, a certain deflation ; vessels are remaining in port or are being worked at a loss.

* * *

The number of motor-transport vehicles was about 720 on September 1st, 1914 ; on September 1st, 1920, it was about 3,800.

Last summer permanent air-services were instituted between Copenhagen and Warnemunde (and thence to Berlin), and between Copenhagen and Hamburg (with connection for London).

Owing to the prohibition issued by the Allies against German aviation outside Germany, the future of these services is very uncertain.

Permanent air-services have not yet been instituted within the frontiers of Denmark, but a certain number of occasional flights have taken place.

The State has set apart an area of about 310 hectares on the eastern coast of Amager, near Copenhagen, for the creation of an aerodrome which will contain the necessary installations for hydroplanes, aeroplanes and airships.

SUMMARY OF BALANCE SHEETS FOR

April 1st, 1913, to March 31st, 1914, and April 1st, 1919, to March 31st, 1920.

State Railways.	1913-1914	1919-1920
I PLANT :		
(a) *Length of lines.*		
Belonging to railways operated by the State.	98,7 km.	98,7 km.
Double track	358,0 »	286,4 »
Single track.	1,741,8 »	1,821,1 »
Length of distances served by steam ferries or vessels	215,0 »	170,0 »
Steam ferry services (home) . .	5	5
Steamship services (home) . . .	0	1
Steam ferries to foreign port:		
Germany	1	1
Sweden.	2	2

State Railways *(continued)*.	1913-1914	1919-1920
Steamship services to foreign Port: Germany	1 km.	0 km.
Denmark supplies the ferries on one of the steam ferry lines to Sweden, while Sweden supplies the ferries on the other line. The steam ferries for the service to Germany are supplied by both countries.		
(b) *Condition of the lines:*		
The lines, bridges, viaducts, etc., are always maintained in good condition in order to ensure safe operation.		
(c) *Improvements:*		
Double-track lines for which credits have been granted		331,4 km.
State railways under construction		177,5 »
(d) *Rolling-stock:*		
Number of locomotives	629	651
Number of passenger coaches	1,606	1,732
Number of seats	75,516	84,529
Number of mail and luggage vans	444	513
Number of goods trucks	9,664	10,812
Capacity of luggage vans and goods trucks, in tons	107,072	133,028
Number of vessels	8	7
Number of ferry-boats (steam)	23	25
Tonnage of vessels and steam ferry-boats; about	9,510	9,970
II. TRAFFIC:		
(*a*) Kilometres run by passenger and goods trains	14,595,862	12,141,700
(In 1919-1920, as in preceding years, there has been a slight reduction in the quantity of train traffic.)		

State Railways *(continued)*.	1913-1914	1919-1920
b) Number of passengers . . .	23,690,045	31,723,390
Goods, luggage and live stock conveyed (in tons)	6,289,750	8,203,951
III. Rates :		
Increase in passenger fares. . .	0	100 %
Increase in goods rates	0	200 %
IV. Fuel :		
a) Consumption of fuel : trains and steam ferries (in tons) .	267,719	329,620
b) Net cost per ton . . . . Kr.	20,8	121, 4
It has been difficult to secure the requisite fuel supply.		
V. At present, owing to higher wages and the increased price of material, especially coal, the financial situation of the State Railways is very unsatisfactory.		

Privately owned Railways.	1913-1914	1919-1920
Total length	1,845,09 km.	2,226,6 km.
State railways operated by private companies	86,0 »	55,8 »
Number of locomotives		293
Number of seats		28,449
Total capacity of goods trucks, tons		39,552
Number of journeys	10,295,190	14,054,884
Goods and live stock carried, tons	3,031,227	4,248,333

ESTHONIA.

I.

RAILWAYS.

A. MATERIAL.

Esthonia, which was proclaimed an independent Republic on February 24th, 1918, was subjected immediately afterwards to the German invasion, and up to November 13th, 1918, the date of the withdrawal of the German troops, its Prcvisional Gouvernment was unable to take any steps with regard to the reorganisation of transport or, indeed, of any other of the economic activities of the country. As the country was immediately afterwards involved in a defensive war against Bolshevik Russia—a war for which she was obliged to mobilise all the forces and resources of the country—the national administration of railways had great difficulty in maintaining the normal traffic of its system.

It should be remembered that during the occupation the German authorities had deprived Esthonia of the greater part of her wagons, locomotives and rolling stock, the value of which at pre-war rates was estimated at 36 million German marks.

On October 1st, 1920, Esthonia had 651 kilometres of railways with a gauge ot 1 m. 524 mm., and 340 kilometres of lines with a narrow gauge of 750 mm.

The railway system was equipped with 340 small bridges of 10 to 20 metres' span ; 12 bridges of 20 to 42 metres' span, and one bridge over the River Narova measuring 141 metres in length. This bridge, as well as 62 other bridges, was destroyed during the war with the Bolsheviks and has subsequently been rebuilt.

On October 1st, 1920, there were 120 locomotives, including 52 under repair on the broad-gauge lines ; the total number of wagons on these lines was 4,083, including 623 under repair. On the narrow-gauge lines (750 mm.) there were 89 locomotives, of which 43 were under repair, and 2,474 wagons, including 237 under repair. The repairs are carried out in the workshops of Reval, Valk and Moisekull.

Several new lines are under construction or have been projected, including :

(a) A direct line from Reval to Moscow. Esthonia was granted a concession for this line in accordance with the Peace Treaty with Russia, and the plans for the portion within the frontiers of Esthonia were completed last summer.

(b) A line, which is also to be constructed, starting from the western extremity of the Isle of Oesel, connecting the towns of Parnau, Wiljandi and Tartu, and finishing at Smolensk ; it will thus constitute the most direct route from the Baltic to South Russia, the basin of the Donetz, and the Caucasus.

The course of these two lines, which are of more than local importance, was fixed last summer ; some of the narrow-gauge portions and some branch lines required for forestry operations have been constructed.

The employment of the Narova waterfalls, capable of furnishing 60,000 h.p. for the electrification of the railways is, also under consideration.

As the execution of these projects is beyond the financial resources of Esthonia, the country will be obliged to conclude a foreign loan, or to grant concessions. In the meantime the Railway Administration will have to employ almost the whole of its resources in order to improve the existing lines and the condition of the rolling stock.

The value of the Esthonian railways, without counting the rolling stock, was estimated on January 1st, 1920, at 1,356 million Esthonian marks. This calculation is based on pre-war Russian statistics, in which one kilometre of broad-gauge line had an estimated value of 50,000 gold roubles and one kilometre of narrow-gauge line was valued at 25,000 gold roubles. Gold roubles are then multiplied by 37,5 in order to obtain the corresponding value in Esthonian money.

As the price of wood fuel and of all necessary commodities rose continually during the year 1920, and as wages have been repeatedly raised, the sums estimated for in the Budget have proved insufficient for present requirements.

The Budget for the year 1921 has been fixed at 755 million marks, allowing for a deficit of 60 millions. The Government will ask for a supplementary credit of 233 million marks for new constructions and the purchase of necessary material.

As the Esthonian railway system was constructed with a special view to transit traffic with Russia, it is clear that, when this traffic is practically at a standstill—as is the case to-day—the same revenue as in normal times cannot be expected.

B. TRAFFIC.

It is extremely difficult, if not impossible, at the present time, to give an exact and representative idea of the traffic on Esthonian railways. The Treaty of Peace with Russia was only ratified on March 30th, 1920, and the demobilisation of the Esthonian troops was completed at a much later date. For this reason the past year may be considered for our purposes as a year of war.

The number of train-kilometres during the eleven months of 1920 (the figures for December are not yet to hand) was as follows ·

On broad-gauge lines: 1,817,254 or 165,205 per month (an average of 7 trains per day);

On narrow-gauge lines: 1,360,311 or 123,665 per month (an average of 10 trains per day).

The number of passengers during the twelve months was as follows:

On broad-gauge lines: 1st class, 197,941 (or 6,83 %) for an average length of 99,08 kilometres; 2nd class, 2,700,606 (or 93,17 %) for an average length of 65,45 kilometres.

This gives a total of 2,898,547 for both classes.

On narrow-gauge lines: 1,192,700 for an average length of 22.1 kilometres.

Goods traffic was as follows:

Broad-gauge Lines.

Express Trains:	No. of Consignments.	Tonnage.	Average in kilometres.
Private consignments	13,320	3,823	136
Government consignments	274	247	119
Military consignments	2,101	3,953	125
Official railway consignments	1,104	1,399	35
Total:	16,799	9,422	116
Slow Trains:			
Private consignments	108,023	487,160	131
Government consignments	2,791	27,310	101
Military consignments	17,637	67,619	104
Official railway consignments	6,019	101,653	101
Total:	134,470	683,742	123

Narrow-gauge Lines:

Express Trains	2,070 tons.
Slow Trains	415,960 tons.

C. REGULATIONS.

No fresh law with regard to railways having been promulgated in Esthonia, the railways continue to be administered according to the laws and provisions which were in force in the former Russian Empire.

D. Fuel.

It should be mentioned that in 1920 the situation of the Esthonian railways was rendered very difficult owing to the impossibility of supplying them with sufficient fuel.

Until the month of July 1920, the locomotives could burn nothing but wood. It was only after that date that schist began to be partially employed as fuel. As the new firms dealing in schist were not in a position to furnish the tonnage necessary for the requirements of the railways, the administration itself took over the working of this enterprise, but their installations are not yet sufficiently advanced to produce the required output. As, moreover, it has not proved possible to receive coal from abroad, although several insufficient tenders have recently been received, wood firing has been used as a substitute.

During the year 1920, the expenditure on fuel for locomotives amounted to 71,400,000 Esthonian marks, *i.e.*:

$$\frac{71{,}400{,}000}{310{,}256{,}636} = 23\ \% \text{ of the total expenditure.}$$

E. General Situation.

There are two railway systems in Esthonia. One includes all the broad-gauge lines and 79 kilometres of narrow-gauge lines, and is the property of the Esthonian State Railways. The second, which comprises 261 kilometres of narrow-gauge lines, is the property of a private company which before the Revolution owned several other lines situated in different parts of Russia. Owing to the absence of any representative of this company, the Esthonian Government has been obliged to take over the administration of this system until the situation is finally regularised.

The narrow-gauge lines, which, as has been said, were constructed to meet the requirements of the countries through which they pass, carry more traffic (ten trains per day) than the broad-gauge lines (seven trains per day) and their financial situation is consequently more satisfactory. These lines have recently been able to cover their expenses by their receipts, but as they have been obliged to incur expenditure for the repair of their tracks and material and the reconstruction of bridges and stations which have been destroyed, they have been obliged to have recourse to a considerable loan which is not guaranteed by the Government.

The State railways, which have been equipped with abundant loop-lines, etc., could deal with a much more considerable traffic than at present ; hence their financial situation is a difficult one. It can only he improved by means of strict economy and by decreasing the number of employees, and important steps have already been taken in this direction. But as soon as normal traffic is resumed, not to speak of the almost certain increase in this traffic, the situation will soon become normal and will continue to be more and more favourable.

E. TRANSIT.

Owing to its geographical situation Esthonia is destined above all to be a country of transit between Russia and the Western nations. This circumstance has influenced the country's policy, and has been taken into consideration by the Government in drawing up the various conventions which have been concluded.

Transit, trade and communications with Russia only began to be resumed gradually in the autumn of 1920. Before that date transit trade was negligible.

The League of Nations sent a delegate to Esthonia to enquire into means of transport, first in the summer of 1920 and again in December 1920.

Two important Conventions relating to transit have been concluded, one with Russia, the other with Latvia.

The Esthonian-Russian Treaty of Peace signed at Tartu contains the following provisions in Article 16, Annex 1 :

> 2. The contracting parties agree, as soon as possible after the ratification of the present Treaty of Peace, to commence negotiations for the conclusion of a commercial treaty based on the following principles :
>
> *(a)* To apply most-favoured nation treatment in their respective territories to the citizens, firms, commercial, industrial or financial companies, to vessels and their cargoes, and to the products of the soil and those of the rural industry of the other Contracting Party, and also to the export and import of the goods of one of the Contracting Parties within the territory of the other Party.
>
> *(b)* Goods in transit across the territory of one of the Contracting Parties are not subject to any import dues nor to any transit tax.
>
> *(c)* The transport rates for goods in transit shall not be higher than those levied upon other kinds of goods consigned to the country.

After the conclusion of this Peace Treaty, dated February 2nd, 1920 a Convention was signed between Esthonia and Russia on September 17th, 1920, regarding direct passenger and goods traffic.

A provisional Convention was also signed on September 18th, 1920, between the railways of Latvia and Esthonia relating to the transit of passengers, passengers' luggage and hand luggage, mail bags, and goods coming from Esthonia into Latvia and *vice versa* through the railway junction of Walk.

II.

INLAND NAVIGATION.

Tartu (Dorpat) is the most important Esthonian port for inland water transport. Situated on the Emajogi, which is navigable for small steamships as far as this town, it is connected with all the ports on the large lake Peipus; the most important of these are Kodawere, Mustvee, Ranna-Pungerja, Wasknarva (Syrenstsi).

Before the war with Russia this port was also connected with Oudowa (Gdoff), Pihkwa (Pskoff), but these relations have not been resumed owing to present internal conditions in Russia. During the summer a vessel plied twice weekly between Tartù and Wasknarva, serving the intermediate Esthonian ports. At Wasknarva there is also a small vessel plying between that town and Joa, which is situated on the river Narova immediately above Narva. This vessel cannot touch at the town itself, on account of the Narova Falls. This waterfall, which is 20 metres high, works several mills, and furnishes a force of 12,000 h.p. At present only a small part of the fall is utilised, but, according to the plans of the Esthonian Government, the fall should be able to supply 60,000 h.p.

It should be possible to travel by waterway from Tartù to Pernau, via Emajogi, Lake Wirtz and the Tanasilmajogi, via Wiljandi (Felinn), Osjujogi and the Parnujogi, for, according to tradition, such connections formerly existed; but this route is not in use at present, and it seems doubtful whether these connections will be restored. The most serious obstacles which prevent the use and development of the internal navigable waterways of Esthonia are, firstly, the long winter period during which they are not navigable, and, secondly, the absence of heavy low-priced goods, as, for example, iron-ore, coal, etc.

III.

MERCANTILE MARINE.

A. Ports.

Owing to her geographical position and the character of her coasts, Esthonia is exceptionally well situated from a maritime point of view. For this reason the Esthonians have been noted from the very earliest times for their love of the sea and their maritime adventures. Esthonian sailors may be found to-day in all parts of the world, and they formed a very considerable part of the former Russian Navy. Since the proclamation of Esthonia's independence and since her flag has appeared for the first time at sea, the Esthonian people have been able not only to renew their maritime activities but also to create a merchant fleet. The latter at present includes the following vessels:

	Number:	Tonnage.
Steamships	52	16,208
Sailing vessels	373	17,087
Motor boats	71	526
Total	496	33,821

During the year 1921 it was hoped to complete 53 small vessels which are now in course of construction. It is obvious that the number of these ships under construction only represents the beginning of a natural evelopment of the country's maritime interests, which depend for theird existence and maintenance on the political independence of the country.

In Annex I [1] a complete statement will be found regarding the Esthonian ports, their present condition, accessibility, etc. ; it will therefore suffice here to give a few words of explanation regarding each of them.

Reval (Tallinn) has always been and still remains Esthonia's most important port. During the Middle Ages it was one of the most important commercial centres of the Baltic Sea, but during the last two centuries, when it was under the domination of the Czars of Russia, it was unable to maintain its former position. Now that the construction of a new line of railway from Reval to Moscow is an accomplished fact, the port of Reval will certainly regain its former place and will once more fulfil the important role which devolves upon it, not only on account of its proximity to Russia, but also because of the facilities which it offers for trade relations with the countries of Western Europe.

With this object the Esthonian Government proposes to establish at Reval a free port possessing all the equipment necessary for the storage of goods and the repair of ships. It may be remembered that two years before the War the Russian Government had decided to build near Reval, at Paljassar, a new base, of large dimensions, and possessing all the necessary installations. It is possible to build at this spot a very large free commercial port with a capacity of more than 500,000 tons, which would be completely independent of the existing port and of the town of Reval.

But though this far-reaching scheme cannot reasonably be contemplated at the present moment, a free port might be built on another site called Port Mine. At this place extensive works have also been undertaken, but, in view of the growing commercial importance of this port, these works should be completed and new establishments should be added.

As regards the present port the enlargement of the west quay was in progress at the time of the outbreak of war ; this has to be completed, and the quays will then have a length of 1,930 feet. The building of this quay, and the other changes which this scheme of reconstruction will involve in the existing port, will result in doubling and even trebling its present capacity. The fishing and coasting trade harbour is also being developed.

In order to adapt the existing port to present needs, it should be provided with all mechanical means for handling goods, such as electric or hydraulic cranes, etc.

Further, in the Bay of Telliskoppel there are two large ship-building yards belonging to the company known as the "Russo-Baltic and Boecker," which are to be connected by rail to the Esthonian railway system and which might form the basis of an independent port at Telliskoppel.

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[1] See table between pages 244 and 245.

Port Baltic (Baltiski) was bounded 200 years ago by Peter the Great, who intended to build a dyke between the island situated to the west (Pakir Saarid) and the mainland. Owing to the depth of the water, which is more than 20 metres, it was found that the construction of this dyke was impossible, so that the present port is not very extensive. However, the port of Marseilles is an excellent example of the fact that, even when there is deep water close in shore, a large port may be built at a reasonable cost. If, as has been proposed, a free port can be established at this place, it must be built on the same lines as that of Marseilles, and its capacity must be made as large as possible. It must not be forgotten that Port Baltic is entirely ice-free all the year round. If, however, the construction of a great port should have to be postponed, it is essential to deepen the present port and to add several quays.

Parnu (Pernau).—This port, which is also very old, is of considerable local importance. Situated at the mouth of the river Pernau it has served for a very long time as a transport route for the products of the rich district through which this river flows ; the market for these products — flax and timber — was Riga. Later the commercial relations of this port increased and after the construction of a narrow-gauge railway and the establishment of a cellulose factory at Waldhof, its traffic with England became very considerable ; it imports coal and exports flax, timber, paper-pulp and paper. In order to enable this port to fulfil present needs, the present wooden wharves would have to be replaced by stone quays, and the mouth of the river and the entrance to the port would have to be deepened to 20 feet.

Narva.—The port of Narva (Joesuu), at the mouth of the river Narova, is situated at a distance of about 12 km. from the town of Narva. As it is not protected from the prevailing westerly winds, its importance is entirely local, and quite inconsiderable. The depth over the bar is only 15 feet. In order to improve the port, it would first of all need to be connected by a branch line to the State railway, and it would also be necessary to deepen it and construct quays.

Haapsalu (Hapsal).—This port owes its importance to the fact that it serves the traffic of the great Esthonian islands Saaremaa (Oesel) and Hiiumaa (Daga) with the mainland of Esthonia. It is not deep, and it is an entirely natural port situated in a small sound, and trading with various small ports in the islands and the archipelago. At the outbreak of war Russia, in order to defend her coast, decided to establish at this point an independent naval base, equipped for the speedy supply of war-ships with fresh water and liquid fuel. With this object the port of Rohukula was built and provided with large reservoirs of water and crude oil, together with the requisite pumps. During the retreat of the Russian armies these establishments were completely destroyed, but the quays still remain and may now, if provided with a few new installations, be utilised for commercial purposes. This port is connected to the station of Hapsal by a branch line 5 km. in length.

Kuresaar (Arensburg) is a port on the island of Saaremaa, having the same depth as Hapsal. Its importance is entirely local but before the war its traffic to Riga was considerable. At a point to the west of this island, near the Vilsand lighthouse, is the port of Kielkond, which is situated in the centre of the Baltic, well protected from winds and completely ice-free. The latter port cannot be fully developed until the scheme to connect the island of Saaremaa with the mainland is carried out.

Mention must also be made of the two small ports situated on the north coast of Esthonia, Loksa and Kunda. The former is both a shipbuilding and repair centre and also a port for the export of the products of a large match factory and of a paper factory ; it is also the centre of a considerable trade in wood fuel and building timber from the neighbouring forests. Kunda was built in order to supply the needs of a cement factory, which makes use of it to export its products and to import materials which it needs, particularly coal.

In this brief summary only the most important ports of Esthonia have been mentioned. Apart from these, there exist a number of small ports (which have lately increased appreciably) used for fishing purposes, or by small coasting versels ; the reason of this development must be sought in the Esthonian Declaration of Independence and it is certain that these ports will rapidly gain in importance.

As regards navigation, all the sea routes in Esthonian waters are completely cleared of mines, and four mine-sweepers are employed to ensure their security. On all the routes, buoys are moored wherever necessary. All the lighthouses are in perfect order and the lightships in their proper positions. Generally speaking, as regards navigation, it may be said that all the Esthonian sea routes are in excellent condition.

B. Traffic and Freight.

Just as Esthonia, as was pointed out in the report on the situation of Esthonian railways, has chiefly concerned herself with the question of railway transit,—in accordance with the policy which she has adopted —she has acted in the same way as regards maritime communications, and intends to apply to the latter the same principles as she applies to land communications.

We must here refer to Article 16, Annex 1, paragraph 3, in the Treaty of Tartu, signed on February 2nd, 1920, by Esthonia and Russia ; this paragraph reads as follows :—

> In the free basin to be opened in the port of Tallinn and in other Esthonian ports, sites shall be reserved for Russia for the transhipment and storage of goods originating from, or destined for, Russia, and the dimensions of these

sites shall be in proportion to the size of the port and the volume of Russian traffic ; moreover, the charges levied on these sites shall not exceed the transit dues levied on Esthonian nationals.

and also Annex 2, paragraph 2, of the same article, which specifies as follows :

> A special convention shall be concluded between the two contracting parties in respect of fishing on Lake Peipus and Lake Pihkva ; such fishing can only be carried on by methods which are not liable to exhaust the stocks of fish in these lakes ; and also with due regard to commercial navigation on these lakes.

The table in Annex IV [1] gives a summary of the amount of goods which passed in transit into Esthonia from or for Russia in 1920.

Several shipping companies maintain regular services, starting from Reval, as follows :—

Tallinn-Hull	with the ships :	Kajak, Sakala.
Tallinn-Copenhagen	» » »	Baltonia.
Tallinn-Stettin	» » »	Wasa, Thorsten.
Tallinn-Stockholm	» » »	Kalewipoes, Gauthic.
Tallinn-Helsingfors	» » »	Viola, Ebba, Munk.

Several other services are under consideration : for instance, a line from Reval to the United States, and several others to England.

The number of passengers and the total amount of traffic for the year 1920 are given in Annexes II and III [2]. It should not be forgotten, however, that 1920 was still a year of war for Esthonia, and that, in consequence, these figures must not be considered as normal.

Passenger and freight rates, after having remained unchanged during 1920, began to decrease in the autumn, and the fall in prices appears to be continuing. The figures given below will provide an indication to these prices during 1920.

Whilst considering these prices it should not be forgotten that 1,000 Esthonian marks are worth about £1 sterling.

Cost of passage (without food) :—

January	Baltonia	Stockholm	700	Esthonian Marks.
February		Stettin	1,000	» »
March	Kajak	Hull	10,000	» »
March	Baltonia	Copenhagen	1,000	» »
June	Tasuja	Helsingfors	600	» »

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[1] See page 252.
[2] See page 247 and 248.-249

RIPTION (

hters. tonnage.)	Pilots.	Lighting of the Port.	Steamship Lines.
(3,263 tons).	rnment Pilots.	Electricity.	2 lines : Stockholm-1 Stettin-3 to England. There are also a few lines plying east.
(140 tons).	rnment Pilots.	Electricity.	
s (1,100 tons). (300 tons). (900 tons). 8 Lighters.	rnment Pilots.	By "Lux" lamps.	One line for traffic on the river Narva.
	here are no anent pilots; must be hired necessary.	By "Lux" lamps.	
ighter steamboat.	rnment Pilots.	By "Lux" lamps.	1. Haapsalu-Kuiwaste-Kuresaar. Haapsalu-Kuiwast-Arensburg. 2. Haapsalu-Leisi-Sorro. 3. Haapsalu - Helternaa - Hapsal - Helterma. 4. Haapsalu-Worms-Hapsal-Worms.
	ivate Pilot.		
teamboat with motor and 1 tor boat with a trol motor.	rnment Pilots.		Kuresaar-Haapsalulull-Kuiwaste. Arensburg-Hapsal *via* Kuiwast.
	ivate Pilot.	By "Lux" lamps.	Reval-Ziter-Loksa-Kasperwieck et Vesu.
ighters.	ivate Pilot.	Electricity.	
Barges.			1. Tartu-Sirents. Dorpat-Sirents. 2. Tartu-Lisja. Dorpat-Lisja.

ANNEX I DESCRIPTION OF THE PORTS OF THE ESTHONIAN REPUBLIC

Name of Port	Depth of harbour in f	Length of Quays (in feet)	Capacity of Port (in tons)	Capacity of Bonded Warehouses (in square feet)	Railway	Loading Plant (cranes)	Tugs	Lighters (Total tonnage)	Docks	Quays (Docks)	Fresh water Supply	Shipbrokers	Stevedores	Pilot	Lighting of the Port	Steamship Lines
Reval	23 30	10,064	35 000	1 333,005 Apart from the warehouses referred to above there are at Reval warehousing firms such as Makkaroff, Brock Janzen, Stemmann Volta Kohlmann and Bekker	There is a standard-gauge line running along the goods quay and Dock No 1 and a narrow gauge line which runs along the Belkof quay the elevator quay and to the southern end of Quay No 1	7 Floating steam cranes, with a lifting power of 73 25 tons	9 Tugs (0 125 800 H P)	19 Lighters (3,263 tons)	4 Floating Docks, 2 of which are connected and capable of lifting a vessel of 3 500 tons	Quay and work shops of the building department of the Commercial Navigation Section besides 3 large building yards and 1 small one in the town	1 Motor boat 2 Lighters, 70 small branches on the quay	1 Lawra steamship [illegible] The Government Shipping Board 2 Lankmann and Co 3 [illegible] 4 John Pyke and Son 5 Stude 6 Pilger and Co 7 [illegible] Reval Shipping Lloyd 8 B Wishart 9 P Lernoldt and Co 10 N Christiansen and Co 11 Gronberg and Co 12 John Narmann	Fixed [illegible]	Government Pilots	Electricity	2 lines [illegible] Stockholm 1 Stettin 3 to England There are also a few lines plying east
Pernau	17	1,558	20,000	270 000	A branch line follows the length of the quay		3 Tugs	2 Lighters (140 tons)		One Government Dock	2 Artesian Wells	1 Joh [illegible] 2 Dicks and Co	The loading [illegible]	Government Pilots	Electricity	
Narva		At Narva 3,805 At the mouth of the river Narva 1 785	4 200 tons [illegible] the river Narva can accommodate 20 vessels	317,080		A hand crane	4 Tugs	14 Lighters (1,100 tons) 3 Lighter (300 tons) 1 (900 tons) Total 18 Lighters				[illegible] at the mouth of the river Narva	[illegible]	Government Pilots	By [illegible]	[illegible] river [illegible]
Port Baltic	17 21	1,000	8,000 10 000 tons	130 340	There is a standard gauge line running along the shore with a branch line running east There is a narrow gauge line on the western quay								[illegible]	[illegible]	By [illegible]	
Hapsal	10	525	1,200 tons	12 000				1 Lighter and 1 Steamboat		Dock of the Marine Guard Ship	1 Artesian Well	Republican Navy	[illegible]	[illegible]	[illegible]	1 [illegible] 2 [illegible] 3 [illegible] Hapsal [illegible] 4 [illegible] Hapsal [illegible]
Rohukull	10	5 005	30 000 tons	80 000	A branch of the standard gauge Hapsal line runs along the middle of Quay No 3						1 Well		[illegible]	[illegible]		
Arensburg	10	2,191		13 867	Narrow gauge line			1 wooden Steamboat with a 25 H P motor and 1 wooden motor boat with a 12 H P petrol motor			Water is brought by rail from the town of Arensburg	Republican Navy	[illegible]	[illegible]		[illegible]
Loksa	18	1,107	2 500 tons	23 100	Narrow gauge line				Careening-Dock capable of accommodating from 1 to 10 vessels (350 tons) at the same time	Careening Dock workshops	River water	Republican Navy under the [illegible] Brickmaking Department		[illegible]	[illegible]	[illegible]
Port Kunda	8 0	400	400	25 000 The warehouses are used by the cement factory of Port Kunda They are capable of holding 75 000 barrels of cement	A narrow gauge line connects the cement factory with the port but the wagons are brought to the quay by horse traction	3 [illegible] cranes	1 Tug	11 Lighters		Copper and tinsmiths workshop	1 Artesian Well	[illegible]	[illegible] working [illegible]	[illegible]	Electricity	
Dorpat and Peipus (Pskoftsa)	8	2,100	10 000	15 000	The construction of a railway is under consideration		4 Tugs	70 Barges		Copper and tinsmiths workshop at the junction of the quay	Artesian Well	1 Lawra [illegible] 2 [illegible] 3 [illegible] and Translating Co	[illegible]			1 [illegible] Dorpat [illegible] 2 [illegible] Dorpat [illegible]

Freight Rates.

Wood	March	Hull	£ 12	per standart.
	May	»	£ 12	» »
	August	»	£ 11	» »
	October	»	£ 7	» »
Flax	March	»	£ 16	per ton.
	May	»	£ 16	» »
	August	»	£ 12 5s.	» »
Coal	May	»	£ 3 10s.	» »
	December	»	£ 1 5s.	» » to £1 10s.

C. FUEL.

The question of fuel has been, and still is, one of the most difficult of solution. Before the war, English coal was very abundant, being brought over as ballast by ships going to load grain in Russia for England; the war put an end to this favourable state of things. English coal was then replaced by Russian, but as a result of the war with Russia this also became unobtainable. The war reduced Esthonia to her own resources and obliged her to make use of her supply of firewood. This resulted, almost at once, in a greatly increased exploitation of firewood, but it has not been possible to make the supply meet the demand.

The following figures throw some light on the price of fuel :—

Wood for firing, per fathom (114 cubic feet)	460-1,250	Esthonian Marks.
English coal, per pood (1/61 tons)	60-165	» »
Schist fuel, per pood	3.20-11	» »

The prices of schist fuel have increased, and have been settled for 1921 on the following basis :—

1st quality	16.50	Esthonian Marks per pood.
2nd »	11.50	» » »
3rd »	7	» » »

The Esthonian Government is at present negotiating to obtain Polish coal from the mines of Dombrova. If this hope is realized it will cause a great reduction in price.

IV.

MOTOR AND AIR TRANSPORT.

Motor transport has not up to the present been developed in Esthonia. Until the autumn 1920, all the motor-cars were requisitioned by the military authorities, but nevertheless, during this period, plans for several motor services were considered, *e.g.*, a service from Kuressar on the island of Saaremaa, to the nearest railway station of Tallinn-Hapsal. It is evidently necessary to create motor transport services, owing to the complete inadequacy of the railway system for the rapidly increasing needs of the country. The establishment of such services is, however, difficult, owing to the bad state of the roads and the fact that they are covered with snow in the winter. Nevertheless, it is to be hoped that a great effort will be made in this direction.

At the beginning of the war against the Bolsheviks, Esthonia was compelled to face the difficulties connected with the creation of an Air Force. She succeeded in overcoming these obstacles and she now possesses a certain number of bold and experienced Esthonian pilots and a fair number of modern aeroplanes. It is nevertheless certain that air transport cannot be undertaken by the State, and can only be developed by the creation of commercial air services. Three different proposals have been placed before the Ministry of Railways and Communications with the object of obtaining concessions, but the examination of these proposals has not yet terminated, so that they have not, as yet, been sanctioned.

ANNEX II.

Passenger Traffic in the Esthonian Ports in 1920.

Ports	Arrival of Passengers	Departure of Passengers
Kuresaar	41	56
Parnu	42	26
Hapsalu	10	18
Baltiski	202	144
Narva Joesuu	262	71
Tallinn-Reval	6,730	7,484
Total	7,287	7,799

In addition, 35,713 prisoners passed through Baltic ports, and 121,661 through Narva-Joesuu.

ANNEX

Goods imported into Esthonia:

Goods	England	Germany	Sweden	Denmark	Finland	Latvia
Flour	194	2,231	34,771	36,827	1	
Sugar	36,363	6	15,360	24,228	9,060	
Herrings	1,916	78,166	14,219	41,422	51,905	
Salted sprats			23,380		55,857	
Salt	4	988,935	10,833	29,230		
Leather	3,527	9,808	3,408	4,262	2,189	2
Wool	2,823	27	1,066	1,787		
Woollen Cloths and knitting wool. . . .	613	23	28	71	390	
Cotton	52,837		14,993		7,635	
Cotton yarn and cotton cloths	2,133	713	1,286	1,192	1,967	
Iron	13,581	109,532	44,293	4,451	6,216	3,081
Agricultural machinery	11,303	15,498	60,120	362	226	5,320
Coal	804,043	5,586				
Petroleum	212,916		51,880	5,467	36	
Manure.		88,145	61,390			
Totals.	1,142,759	1,298,670	336,806	149,939	135,572	8,493

III.

Customs Statistics for 1920 (in poods).

Norway	Holland	Austria	Poland	America	France	Lithuania	Totals
				12,368	17		86,409
	26,253			657	14		113,117
292,519					7	4,442	484,596
							79,237
			74,326	14			1,103,342
				55			23,251
					61		5,764
							1,125
				4,067			79,532
212							7,502
3		714		11		4,644	186,526
				38,175			131,034
							809,629
				49,806			320,045
				331,940			481,285
292,734	26,253	714	74,326	437,093	99	9,086	3,912,394

ANNEX

Goods exported from Esthonia:

Goods	England	Germany	Sweden	Denmark	Finland
Potatoes		223,981	201,631	39,917	177,095
Alcohol litres	7,220	3,000	1,456,620	72,600	4,040
» poods	361	150	72,832	3,630	202
Wood	3,198,852	1,368	29,056	94,568	71,890
Pulp	156,348	6,764	121,265	156,594	12,206
Paper	25,381	31,552	52,776	25,527	25
Flax	150,407		2,442	8,600	
Bricks					228,953
Cement	11	11,990	145,519	440	88,028
Totals	3,531,360	275,905	506,420	329,276	578,399

III (Continued).

Customs Statistics for 1920 (in poods).

Latvia	Holland	France	Russia	Morocco	Lithuania	Totals
13,737			868,153		4,511	1,534,007
146,780			40			1,690,300 litres
7,339			2			84,515 poods (1)
	667,647	9,733	4,750	34,380		4,113,144
		20,646				353,823
109,780	22,335	175,795	452,717			895,988
12,501		34,085				208,035
						228,953
11,000		55				257,043
159,337	689,982	240,314	1,325,622	34,380	4,511	7,675,506

(1) 1 standart = 165 poods.

ANNEX IV.

Goods in transit between Esthonia and Russia via Narva in 1920.

	Tons.
A. Imports into Russia.	
Salt	839,5
Food products	2,413,1
Leather and leather goods	1,400,0
Wood	4,6
Wooden articles	3,1
Paper and printed matter	485,2
Textiles and footgear	2,052,1
Iron and steel (raw and partly manufactured)	385,3
Steel articles and tools	1,489,8
Other iron articles	1,153,2
Lead and brass articles	1,814,7
Agricultural implements and machinery	7,146,9
Miscellaneous machinery and vehicles	710,4
Surveying instruments, apparatus and tools	110,8
Grindstones and whetstones	366,4
Coal	1,442,6
Oil and mineral fats	104,6
Other oils and fats	8,6
Rubber articles	56,2
Chemical products	1,977,6
Sundry goods	744,7
B. Exports from Russia.	
Veneer	2,382,7
Linen	1,132,9
Sundry goods	23,0

ANNEX V.

List of Ships having entered the Port of Tallinn-Reval classed according to their flag and type.

Nationality.	Steamers.		Motor-propelled vessels.		Sailing Ships.		Total.	
	Number.	Net tonnage.	Number.	Tonnage.	Number	Tonnage.	Number.	Tonnage.
Esthonian . .	211	45,115,39	626	3,380,14	1,412	10,492,99	2,249	88,976,52
British	14	13,655,13	—	—	—	—	14	13,655,13
American. . .	8	20,303,—	—	—	—	—	8	20,303,—
German	100	52,749,49	2	324,55	2	4,244,28	104	57,318,32
French	2	2,380,—	—	—	—	—	2	2,380,—
Swedish	62	18,010,02	47	5,876,97	4	223,49	113	24,110,48
Finnish.	177	43,505,58	155	5,209,85	36	1,946,17	378	50,661,60
Danish	30	16,638,80	14	1,565,21	10	1,156,72	54	19,360,73
Dutch.	22	5,364,72	—	—	1	76,85	23	5,441,55
Norwegian. .	12	7,420,41	5	1,115,15	1	52,01	18	8,587,57
Russian	—	—	—	—	2	189,56	2	189,56
Latvian	19	2,817,35	—	—	1	1,39	20	2,818,70
Total. . .	657	227,959,89	849	17,471,87	1,459	48,371,44	2,975	233,003,50

ANNEX VI.

List of Ships having entered the Port of Tallinn-Reval classed according to their flags.

Nationality.	1909		1919		1920	
	Number.	Net Tonnage.	Number.	Tonnage.	Number.	Tonnage.
British	—	—	29	46,068,—	14	13,655,13
American	—	—	12	19,636,—	8	20,303,—
German.	—	—	37	13,021,89	104	57,318,32
French	—	—	3	6,380,—	2	2,380,—
Swedish.	—	—	38	4,304,62	113	24,110,48
Danish	—	—	14	2,434,49	54	19,360,73
Dutch	—	—	28	3,962,05	23	5,441,55
Norwegian. . . .	—	—	11	3,026,97	18	8,587,57
Russian.	—	—	26	1,092,05	2	189,56
Finnish	—	—	302	30,830,18	378	50,661,60
Latvian	—	—	32	1,272,92	20	2,818,74
Esthonian	—	—	855	55,774,66	2,249	88,976,52
Total . . .	14,429	3,891,854	1,387	210,519,23	2,975	293,803,27
Net average tonnage of ships.	—	270,—	—	152,—	—	100,—

FINLAND.

RAILWAYS.

Length of State Railways.

	Actual length 1920	Length worked 1920
Helsingfors-Tavastchus-Rajajoki (frontier)	527 km.	527 km.
Rajajoki-Petrograd	40 »	—
Hanga-Hyvinkää	153 »	153 »
Abo-Tammerfors-Tavastehus . . .	212 »	212 »
Vasa-Tammerfors	313 »	313 »
Torneå (frontier)-Seinäjoki	495 »	495 »
Kajana-Kotka.	556 »	556 »
Nurmes-Imatra-Viborg	642 »	642 »
Björneborg-Tammerfors	164 »	164 »
Pieksämaki-Suolahti-Haapamäki. .	198 »	198 »
Abo-Karis-Fredriksberg	195 »	195 »
Pieksämaki-Elisenvaara	204 »	204 »
Rovaniemi-Laurila	109 »	109 »
Kristinestad-Kaskö-Seinäjoki . . .	142 »	142 »
Koivisto-Terijoki	74 »	74 »
Total :	4,024 km.	3,984 km.

The capital of the State Railways on December 31st, 1919, was 451,517,406 marks, or, according to the Central Statistical Bureau of Finland, 2,440,000,000 marks.

Financial Results obtained by the State Railways.

	1919		1920	
WORKING REVENUE.	Marks.	Per kilometre in working.	Marks.	Per kilometre in working.
Passengers:				
1st class	843.800	212	1.248.000	313
2nd »	21.785.100	5.468	27.375.700	6.871
3rd »	76.990.800	19.325	90.352.500	22.679
Reduced prices	16.285.100	4.088	6.525.000	1.637
Other receipts obtained from passenger traffic	9.261.400	2.324	11.263.200	2.827
Total	125.166.200	31.417	136.764.400	34.328
Goods:				
Slow train	158.031.100	39.667	205.271.000	51.524
Express train	10.028.000	2.517	10.021.900	2.516
Other receipts from goods traffic	7.785.600	1.954	11.620.600	2.917
Total	175.844.700	44.138	226.913.500	56.957
Sundry receipts	4.108.100	1.031	6.941.200	1.742
Total receipts	305.119.000	76.586	370.619.100	93.027
WORKING EXPENDITURE				
General Administration	6.878.700	1.726	7.616.800	1.912
Traffic and Circulation	31.320.600	7.862	35.013.800	8.789
Supervision and Maintenance	22.134.200	5.556	28.785.700	7.225
Traction and Material	73.270.800	18.391	94.046.500	23.606
Bonuses	75.500.000	18.951	111.759.500	28.052
Sundry Expenses	3.059.800	768	3.635.100	912
Total Expenditure	212.164.100	53.254	280.857.400	70.496
Excess of Revenue over Expenditure	92.954.900	23.332	89.761.700	22.531

Passenger and Goods Traffic on the State Railway Lines.

PASSENGERS.	1919	1920
1st Class	8,600	11,700
2nd ,,	769,400	1,114,500
3rd ,,	11,429,900	15,394,200
Reduced Prices	1,134,800	350,300
Total	13,342,700	16,870,700

GOODS.	Tons.	Tons.
Slow trains	3,985,471	5,146,928
Express trains	47,191	53,800
Total	4,032,662	5,200,728

Rolling Stock of the State Railways and Distances covered.

	1919		1920	
	Number.	Kilometres covered.	Number.	Kilometres covered.
Locomotives	523	20.698.500	549	23.871.800
Passenger Coaches	921	61.486.700	956	65.902.800
Axles	2.255	167.488.600	2.372	181.706.200
Goods Trucks	12.601	175.881.100	13.233	226.053.700
Axles	26.352	365.142.400	27.622	469.959.800

Distance covered by Trains.

	1919	1920
Passenger trains	8.443.000 km.	8.982.500 km.
Goods trains	5.484.400 ,,	7.052.200 ,,

Staff of State Railways in 1919.

	Staff		
	Employees	Day Labourers	Total
General administration	893	5	898
Traffic and circulation	8,341	1,227	9,568
Supervision and maintenance	1,296	2,610	3,906
Traction and material	2,876	2,589	5,465
Total...	13,406	6,431	19,837

FRANCE.

I.

RAILWAYS.

New Lines.

According to the general observations which appear in the estimates for 1921 and 1922, the programme of work to be undertaken affects the following lines :

(*a*) Two routes traversing the Vosges—namely, from St. Maurice to Wesserling and from St. Dié to Saales.

The former of these two lines will connect the two branches of the line from Epinal to Mulhouse ; the latter will establish direct communication between Epinal and Strasburg. This work was declared to be of public utility on March 28th, 1920, and a section of the line from St. Dié to Saales will probably be open by the end of 1922.

(*b*) Lines from Lérouville to Thiaucourt and from Pont St. Vincent to Blainville ; the former, 34 kilometres in length, will establish direct communication between Metz and Bar-le-Duc ; the latter, 4 kilometres in length, will link Toul with Blainville, without passing through Frouard and Nancy.

(*c*) A line from Limoges to St. Germain-des-Fossés, which is intended to improve the Bordeaux-Lyon line.

(*d*) A line from St. Germain-des-Fossés to Paray-le-Monial, which will facilitate traffic between Bordeaux and Mulhouse.

(*e*) A line from Rouen to Havre and a line crossing the Seine and connecting Havre with the western districts.

(*f*) A line from Nantes to Paimbœuf through Le Pellerin.

Among larger undertakings in contemplation the programme mentions the following :

(*a*) The Channel Tunnel.

(*b*) A line joining the Paris-Nord and the Paris-P.L.M. stations, which will enable passengers to travel to, or return from, England without crossing Paris.

(*c*) Quadrupling the tracks of the Paris-Orleans line between the St. Michel bridge and the Archevêché bridge.

(*d*) Construction of a line passing round the town of Nantes, and removal of the station to a different site with a view to improving the line from Nantes to Savenay.

(*e*) The electrification of the main railway systems; this will affect a length of 8,839 kilometres, according to the plan, the power being derived, for the P.O. Company, from the Haute-Dordogne and for the P.L.M. Company, from the Rhône.

The new lines (including lines which are to be doubled or quadrupled at the request of the military authorities) which are under construction or projected may be divided into four classes:—

CLASS I.—Lines under construction which will certainly be completed, though the rate at which the work will be pushed on may vary according to the importance attached to these lines and according to their progress towards completion.

The following lines are included in this category:

State railways:—

The line from Paris to Chartres, via Gallardon (85 km. 6) and from Châteaulin to Camaret (52 km. 9).

Nord railway system:—

The line Aulnay-sous-Bois to Rivecourt (67 km.).

The P.O. railway system:—

Villeneuve-sur-Lot to Falgueyrat (38 km.).
Cahors to Moissac (61 km.).
Montluçon to Gouttières (42 km. 2).

The Est railway system:—

Briey to Hussigny and to Villerupt (4 km.).
St. Dié to Saales (24 km.).

The P.L.M. system:—

Nice to Coni (63 km.).
La Ferté Hauterive to Gannat (35 km.).
Riom to Vichy (41 km.).
Monéteau to St. Florentin (25 km.).
Le Puy to Niegles-Prades (93 km.).
Chorges to Barcelonnette (42 km.).

The Midi system:—

Connecting line from Midi-Médoc to Bordeaux (14 km.).
Transpyrénéan (71 km.).

Colombiers to Cruzy (20 km.).
Estréchoux to Plaisance (10 km. 5).
St. Girons to Oust (16 km.).
Condom to Castéra-Verduzan (23 km.).
Carmeaux to Vindrac (25 km.).
Bazas à Auch (99 km. 5).
Beaumont to Gimons (31 km. 5).
Albi to St. Affrique (76 km. 5.)
Auch to Lannemezan (69 km. 5).
Agetmau to Pau (54 km.).

The Alsace-Lorraine system:—

Rothau to Saales (17 km.).
Waldighoffen to St. Louis (22 km. 7).
Boulange to Ottanges and Rumelange (10 km. 4).
Reding to Drulingen (19 km. 5).
Richemont to Grandange (1 km.)
Neuf-Brissach to Bantzenheim Haberhaeuser (48 km.).
Moyeuvre-Grande to Homécourt (5 km. 4).
Adlergrund to Hussigny (2 km. 3).
Amanviller to Gravelotte (9 km. 3).

Subsidiary systems:—

La Mure to Gap via Corps (84 km. 8).
Cheylard to Aubenas (61 km. 5).
Ghisonacciato Bonifacio (105 km. 7).

Class 2.—Lines which have been authorised or declared to be of public utility, but which are not yet under construction. These lines may again be subdivided according to their degree of urgency, those being considered of secondary urgency which are not of sufficient importance — in view of the present financial situation — to warrant their being constructed immediately.

State railways:—

Beuzeville to Lillebonne (5 km.).

The P.O. system:—

Libourne to Langon (46 km.).
Treignac to Bugeat (18 km.).
St. Leonard to Ouzances (98 km.).
Confolens to Bellac (49 km. 5).
Bonnat to Evaux (74 km. 7).
Argentat to Salers (67 km.).

These six lines are of primary urgency.

Limours to Dourdans (20 km.). (Secondary urgency.)

The P.L.M. system :—

Chamborigaud to Bessèges (16 km.).
Maringues to Randan (11 km. 8).
Oullins to St. Etienne (53 km.).
Briançon to Oulx (20 km.).
These four lines are of secondary urgency.

The Midi system :—

St. Paul-St. Antoine to Lavelanet and Belesta (5 km. 5). (Primary urgency.)
Castelnau to Magnoac and Tarbes (51 km.).
Arreau to St. Larry (11 km.).
Both of secondary urgency.

The Alsace-Lorraine system :—

Cernay to Wesserling (18 km.).
St. Louis-les Bitch to Volmunster (19 km. 9).
Ingwiller to la Petite Pierre (14 km. 4).
All three of secondary urgency.

Military lines :—

Nançois to Léronville (to be quadrupled, a work of primary urgency.)

Special lines for through traffic :—

The Channel Tunnel (25 km.).

CLASS 3.—Lines which have been authorised but not yet declared to be of public utility ; these may also be regarded as being of secondary urgency.

State railways :—

Pont-Audemer to Port Jérome, passing under the Seine and continued as far as Havre (71 km.).
Carentan to Périers (19 km.).
Both of secondary urgency.
La Gouesnière to Cancale (12 km.). (Primary urgency.)

P.O. system :—

Magnac-Laval to St. Sébastien (38 km.).
Gouttières to Eygurandes (62 km.).
Aurillac to Espalion (66 km.).
Ussel to Bort (29 km.).
All of secondary urgency.

Est system :—

Toul to Nancy via Pont-St. Vincent (16 km.).
Esbly to Coulommiers (9 km.).

Both of secondary urgency.

P.L.M. system :—

Chatelguyon to Combronde (8 km.). (Secondary urgency.)

Midi system :—

Bourg-Madame to Latour (7 km.).
Villefranche to Vernet (9 km.).

Both of primary urgency.

Belesta to Quillan (28 km.).
Espalion to St. Flour (93 km.).
Montlouis to Quillan (87 km.).
Oust to the frontier (23 km.).

All of secondary urgency.

Subsidiary systems :—

Draguignan to Castellane (58 km.).
Castellane to St. André (16 km. 8).
Meyrueis to Millau (41 km.).

All of secondary urgency.

Class 4.—Lines which it is proposed to construct in the near future. Only those projects need be mentioned which are already recognised as important and which have been recommended by the Administration.

State systems :—

Havre to Rouen and Pont de l'Arche (right bank of Seine) (107 km.).
Lillebonne to Pont-Audemer by ferry-boat (26 km.).
Nantes to Paimbœuf (17 km.).

P.O. system :—

Switzerland to the Atlantic.
Limoges to St. Germain-des-Fossés (180 km.).

The Est system :—

Lérouville to Thiaucourt (33 km.).
Pont-St. Vincent to Blainville (26 km.).

P.L.M. system :—

Amplepuis to Tarare (13 km. 6).
St. Germain-des-Fossés to Paray-le-Monial (66 km.).
The linking of the Rove to the Mirabeau Basin (10 km. 1).

The Alsace-Lorraine system :—

Hausbergen and Graffenstaden to the new marshalling station of the Rhine port (10 km.).
Créhange to Longueville-les-St. Avold (20 km. 7).
Dieulouard to Remilly (36 km. 1).

Subsidiary systems :—

Bobigny to Sucy-Bonneuil (23 km. 7).

Special lines for through traffic :—

Line connecting the Nord and P.L.M. stations in Paris (8 km.).

The summary contained in the following Recapitulation Table shows the expenditure for each system, reckoned in millions of francs at pre-war prices.

All estimates contained in these tables are based on pre-war prices, but they do not allow for the various subsidies (which must therefore be deducted from the totals), nor for the contributions from companies which, in respect of the first three Classes, amount to 25,000 francs (or 12,500 francs per kilometre according as the lines in question are broad or narrow gauge), and in respect of the 4th Class, to 20 % of the works undertaken under the new regime.

In order to estimate the charges borne by the State at the present time, an increase in pre-war prices would have to be reckoned in respect of the whole programme, amounting to 2,5 for the permanent way and to 4 for the road bed. By estimating in this way we should obtain the following totals :

(1) Considering only works of primary urgency under Classes 2 and 3.

Class	1.	Lines under construction : 594,9 × 3,5	2,082 m.
»	2.	Lines authorised and declared public utilities on which work has not yet begun (primary urgency) 124,25×3,5	435 m.
»	3.	Lines authorised but not yet declared to be of public utility (primary urgency) : 8,5×3,5	30 m.
»	4.	Lines projected : 937,8×3,5	2,582 m.
		Total	5,129 m.

RECAPITULATORY

Names of Lines.	1. Lines under construction.			2. Lines declared of public utility on which work has not yet begun.		
	Expenditure estimated in millions of francs at pre-war prices.			Expenditure estimated i millions of francs at pre war prices.		
	Totals.	Expenditure effected Jan. 1st, 1922.	Expenditure to be effected on Jan. 1st, 1922.	Totals.	Primary urgency.	Secondary urgency.
State system	213,9	83,4	130,5			
Nord system	51,0	10,0	41,0			
L'Est system	5,1	0,2	4,9			
Paris to Orleans system	33,5	10,7	22,8	67,3	57,5	9,8
Paris to Lyons and to the Mediterranean	408,5	140,6	267,9	54,7	»	54,7
Midi system	180,45	109,85	70,6	12,3	5,5	6,8
Ceintures system						
Alsace-Lorraine system						
Lines for through traffic				200,0 (1)		200,0
Military lines. Doubling and quadrupling of existing military lines or of lines which are being restored. Connection between lines. Military lines on which work is being recommenced				12,5	12,5	
Lines crossing the Vosges	20,0	4,4	15,6	48,75	48,75	
Subsidiary system	50,8	9,2	41,6			
Totals at pre-war prices	963,25	368,35	594,9	395,55	124,25	271,3

TABLE.

3. Lines authorised but not yet declared public utilities.			4. Lines to be built in the near future.	Remarks.
Expenditure reckoned in millions of francs at pre-war prices.			Expenditure reckoned in millions of francs at pre-war prices.	
	Degree of urgency.			
Totals.	Primary urgency,	Secondary urgency.		
3,1	3,1		181,2	*Note :* In these tables, neither the contributions which have still to be paid by units, nor the share of the companies in the expenditure on permanent way and on road bed, if any, under the new system, have been deducted from the totals. The plans have not yet been adopted. The expenditure will be comparatively low. (¹) Channel Tunnel. (²) Linking up of the Nord and the P. L. M. systems in Paris.
			»	
4,0		4,0	»	
72,2		72,2	146,0	
3,6		3,6	93,5	
98,6	5,4	93,2	—	
			35,0	
			—	
			49,0 (²)	
			178,0	
			55,1	
18,6		18,6	»	
200,1	8,5	191,6	737,8	

(2) Including works of secondary urgency under Classes 2 and 3.

Class	1.	Lines in operation : 594,9 × 3,5	2,082	m.
»	2.	Lines authorised and declared of public utility, but on which work has not yet begun (primary and secondary urgency) : 395,55 × 3,5	1,384	»
»	3.	Lines authorised, but not declared of public utility (primary and secondary urgency) : 200,1 × 3,5	700	»
»	4.	Lines projected : 737,8 × 3,5 ½	2,582	»
		Total	6,748	m.

Allowing an average period of fifteen years for the carrying out of these plans, the annual expenditure under No. (1) would amount to approximately 340 millions (this figure is somewhat higher than the estimated expenditure for 1922, which amounts to about 300 millions), and in respect of programme (2) to about 450 millions.

Rolling Stock Returns for the Whole of the Main Railway Systems excluding Alsace-Lorraine.

(Including Armistice material and American rolling stock.)

Item.	On January 1st, 1914.			On November 1st, 1921.		
	Total Stock on the Railways (1)	Material under repair (2)	Material available for use (difference between Cols. 1 & 2) (3)	Total Stock on the Railways. (4)	Material under repair (5)	Material available for use (difference between Cols. 4 & 5) (6)
Locomotives	13,754	1,603	12,151	18,314	3,616	14,698
Wagons (Express) (coaches and vans) . . .	48,082	4,970	43,112	46,907	12,424	34,483
Wagons (Slow traffic) . . .	364,454	14,715	349,739	473,365	64,536	408,829

Number of kilometres covered by passenger and goods trains.
Number of passengers for any distance and per kilometre.
Number of kilometric tons carried by slow trains on each of the main railway systems. [1]

Comparative Statistical Tables: Years 1913 and 1920.

		System	Year 1913	Year 1920	Difference between 1913 and 1920	
					+	—
Number of kilometres covered by	Passenger Trains	Nord	35,356,228	17,775,621		17,580,607
		Est	38,846,640	20,178,380		18,668,260
		P. L. M.	55,922,270	32,539,794		23,382,476
		Orleans	43,248,688	23,367,368		19,881,320
		Midi	19,160,602	9,771,415		9,389,187
		State	51,592,257	24,773,416		26,818,841
		Outer Circle	663,223	480,006		173,217
		Inner Circle	1,252,354	673,132		579,222
		Totals	246,032,262	129,559,132		116,473,130
	Goods Trains	Nord	28,835,638	20,644,233		8,191,405
		Est	24,895,820	17,015,709		7,880,111
		P. L. M.	39,056,156	36,412,367		2,643,789
		Orleans	19,925,748	22,512,975	2,587,227	
		Midi	10,885,704	9,757,316		1,128,388
		State	29,286,626	26,468,805		2,817,821
		Outer Circle	922,862	993,644	70,782	
		Inner Circle	363,064	281,290		81,774
		Totals	154,171,618	134,086,339	2,658,009	22,743,288
					— 20,085,279	

Number of Passengers carried	Adny distance	Nord	115,002,248	108,239,475		6,762,773
		Est	92,299,140	91,622,197		676,943
		P. L. M.	93,961,606	88,002,582		5,959,024
		Orleans	59,078,232	63,675,245	4,597,013	
		Midi	28,597,901	27,720,589		877,312
		State	136,624,211	136,795,979	171,768	
		Outer Circle	1,229,749	839,941		389,808
		Inner Circle	14,071,735	10,237,533		3,834,202
		Totals	540,864,822	527,133,541	4,768,781	18,500,062
					— 13,731,281	
	per kilometre:	Nord	3,135,386,196	3,847,362,678	711,976,482	
		Est	2,719,783,412	3,148,293,448	428,510,036	
		P. L. M.	4,899,244,545	5,911,915,159	1,012,670,614	
		Orleans	3,044,176,240	3,557,613,476	513,437,236	
		Midi	1,468,013,057	1,506,012,740	37,999,683	
		State	3,943,454,729	4,251,479,343	308,024,614	
		Outer Circle	13,875,357	8,393,549		5,881,808
		Inner Circle	89,035,467	67,754,286		21,281,182
		Totals	19,312,969,004	22,298,824,679	3,012,618,665	27,162,990
					+ 2,985,855,675	
Number of kilometric tons by slow trains:		Nord	5,155,790,656	4,474,508,916		681,281,740
		Est	5,098,247,248	4,215,747,156		882,500,092
		P. L. M.	33,069,709,341	29,889,392,801		3,180,316,540
		Orleans	3,385,673,605	4,426,369,626	1,040,696,021	
		Midi	1,815,255,893	1,769,433,417		45,822,476
		State	3,178,882,052	3,586,182,502	407,300,450	
		Outer Circle	191,959,037	308,946,235	116,987,198	
		Inner Circle	30,139,687	30,105,304		34,383
		Totals	51,925,657,519	48,700,685,957	1,564,983,669	4,789,955,231
					— 3,224,971,562	

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[1] In 1921 the number of passenger-train-kilometres increased considerably in comparison with 1920. The statistics are not yet available.

Remarks regarding the Increase in Passenger Fares and Freight Rates.

Early in 1917 the necessity for revising transport rates became apparent ; the continued increase in the price of all commodities had adversely affected the balance between the receipts, the expenses of operation and the financial charges of the Companies. In order to meet the deficit brought about by these conditions, all railway rates were raised. A further increase of these rates was resorted to in order to meet the increased charges due to the economic disorganisation consequent upon the war, but a different rate of increase was adopted for passenger fares and for freights.

1. *Passenger Fares.*

In accordance with the Law passed on April 15th, 1918, passenger fares were increased by 25 %. The Law of February 14th, 1920, sanctioned a further increase, which was fixed at : —

45 % for third-class fares ;
50 % for second-class fares ;
55 % for first-class fares.

This increase was added to the above-mentioned increase of 25 % and did not take the place of the latter.

Further, the Law of June 29th, 1918 (Finance Act), placed a tax of 25 %[1] on the price of seats for passengers, and of 50 % on the supplementary tickets issued for special accommodation *(places de luxe)*.

Passenger fares, including tax, therefore exceed those of 1914 by :

80 % in the case of third-class fares ;
84 % » » second-class fares ;
88,65 % » » first-class fares.

There have been additional increases, varying in amount on the different railway systems, in the price of special accommodation *(places de luxe)*.

2. *Goods Freights.*

The increases in freights are of two kinds : first, those which result from legal provisions and which are uniform, being unaffected by the tariff ; secondly, those which result from the standardization of tariffs on the French railways, and which vary according to these tariffs and the traffic concerned.

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[1] Superseding the 12 % increase.

The former include the increase of 25 % provided by the Law of April 15th, 1918, and also the increase of 115 % laid down by the Law of February 14th, 1920 ; the latter increase is added to the former, and does not take its place.

The latter increases, which are variable, do not in any case exceed 50%.

A tax of 10 or 5 %, according to the amount of these tariffs, is placed upon freights, including the above-mentioned increase of 25 % (Finance Act of June 29th, 1918, and Law of February 14th, 1920).

Altogether, the increase on goods freights is therefore :

278,75 % on goods included in the first four categories of the general tariff ;

269,40 % on goods included in the fifth and sixth categories of the general tariff, and on food-stuffs.

Fuel consumed by French Railways in 1913 and 1920 and Average net cost per Ton of this Fuel.

Railways.	1913		1920	
	Tonnage consumed.	Average net cost.	Tonnage consumed.	Average net ccst.
		Francs.		Francs.
Nord..................	1,596,647 tons.	16.80	1,566,020 tons.	192.56
Est....................	1,283,857 ,,	20.07	1,201,517 ,,	188.99
P.-L.-M..................	1,871,621 ,,	25.00	2,339,000 ,,	252.00
P.O....................	1,354,193 ,,	22.09	1 633,150 ,,	257.78
State..................	1,424,100 ,,	26.07	1,638,594 ,,	296.62
Midi..................	551,738 ,,	20.53	523,738 ,,	242.35
General total of tonnage..	8,082,156 tons.	Francs.	8,902,019 tons.	Francs.
Average net cost per ton .	....	22.19	....	238.38

The fuel consumed in 1920 was supplied by the National Coal Office (Bureau national des charbons). It was obtained from Germany (Ruhr and Saar), France, England and America.

3. *Financial Situation of Railways in* 1913 *and* 1920.

During the war ordinary industries increased both their output and their prices, thus more than covering their additional expenditure, and contributing to the general rise in prices ; the railways, on the other hand, whilst their commercial traffic decreased, were unable to increase their tariffs, and were thus obliged to submit to a constant increase in running expenses and a simultaneous decrease of traffic. The tariffs for military transport, which were at first extremely low, were raised retroactively, but this increase only compensated for a part of the deficits occasioned by the delays in raising commercial tariffs, which could not be increased with retroactive effect, and were themselves insufficient to cover the still increasing expenses.

As compared with the exclusively commercial receipts of 1913, which amounted to 2,021 millions, the commercial and military receipts written off decreased by 17 % in 1914, and by 16 % in 1915, and increased by 3 % in 1916, 8 % in 1917, 23 % in 1918, 58 % in 1919 and 165 % in 1920; whilst running expenses, which remained almost stationary in 1914 and 1915, increased as compared with those of 1913 (1,277 millions), by 22 % in 1916, 44 % in 1917, 97 % in 1918, 218 % in 1919 and 446 % in 1920.

The coefficient of running expenses, which was 63 % in 1913, increased to 71 % in 1914 and 1915, to 75 % in 1916, to 84 % in 1917, to 101 % in 1918, to 127 % in 1919 and to 132 % in 1920.

The charges on capital, including dividends, were 806 millions in 1913 and 1,444 millions in 1920.

The annual increase of charges on capital during the War was higher on an average than that during the years preceding the War, although during the War, as an exception to the general regulations resulting from agreements, the expenses for work on new lines were repaid in capital by the Treasury, and complementary work was diminished.

If, in spite of this, the charges increased considerably, the reason may be found in the increase of the rates of interest and liquidation of new loans, and in the importance of these loans in view of the inclusion of the deficits of running expense of the two railways, the Nord and the P.L.M., in the budget of initial expenditure, in virtue of the Law of December 26, 1914.

The decrease in receipts and the increase in expenses and charges resulted in deficits of 389 millions in 1914, 358 millions in 1915, 345 millions in 1916, 555 millions in 1917, 975 millions in 1918, 1,850 millions in 1919, and 2,880 millions in 1920, — taking into account the payment of the last 1/12 of the receipts connected with military transport, but not including the amount of the increases in price for this transport.

Up to 1918, the ordinary receipts on all the large systems exceeded the running expenses, not including the charges on capital ; from 1918 onwards the receipts did not even cover the actual running expenses, which exceeded them by about 20 millions in 1918, by 875 millions in 1919 and 1,736 millions in 1920.

On December 31st, 1920, the debts of the guarantee as to interest of the Midi and Orleans Companies had increased in capital and interest by 377 millions and 776 millions respectively. The Compagnie, de l'Est, which paid off all its debts in virtue of the Convention of September 6th, 1911, had on the same date contracted a new debt of 734 millions. In 1914, the year which coincided with the expiration of its right to the guarantee as to interest, the P. L. M. Company, which had similarly liquidated its guarantee debts, appealed to this guarantee, to the extent allowed by its agreement, for a capital of 30,400,000 francs. The Compagnie du Nord, which had never had recourse to die State for financial assistance and whose right to the guarantee as to interest ended, as in the case of the P. L. M., on December 31st, 1914, contracted for 1914, within the limit fixed by its agreement, a debt of about 12 millions. All these guaranteed advances were productive of interest, in virtue of the contracts, of 1883, which could not foresee debts of this magnitude arising from such a source,

On the other hand, the two companies of the Nord and P. L. M. authorised for the years 1914-1920 inclusive to compensate for the deficit (1914) and termination (previous years) of the guarantee as to interest by including their deficits on their budget of initial expenditure, had to borrow for this purpose, for the running expenses of 1914-1920, 1,102 and 1,229 millions respectively in round figures, which formed the debts of these companies towards themselves and for which the annual charges laid an additional burden on their budgets.

Such are the results of the accounts, as far as they can be at present established, for each of the years 1914 to 1920. These accounts are, however, only provisional ; the expenses of military transport, for which the tariffs were increased with retroactive effect, both for the French and Allied armies, are not yet settled. The payment of the sums thus owed for these transports will considerably augment the credits for each year ; it is therefore not possible under these circumstances to supply statistical information of a definitive nature.

Article 19 of the Convention signed on June 28th, 1921, between the State and the railways and approved by the Law of October 29th, 1921, on the new system of railways, released the railways from their debts *(dettes de garantie)* contracted after December 31st, 1913, and from the deficits occurring since that date in the accounts of initial expenditure of non-guaranteed railways.

The complete text of the Article is as follows :—

"The guaranteed debts contracted in fiscal periods prior to 1914 shall be fixed as from December 31, 1913 : they shall cease to bear interest from that date, except in the case provided for in the penultimate paragraph of Article 21 following: their payment cannot be required except on the expiry of a concession or in case of re-purchase.

" The State releases the companies from the debts contracted by them on the basis of guarantee as to interest in 1914 and following years up to the coming into force of the new regime.

" The State shall repay to the Nord and P. L. M. Companies, by annual payments up to the expiry of the concession and in conformity with Article 15 *b*, the sums included or to be included on the establishment budget of these two railways in application of Article 20 of the Law of December 26, 1914, and not covered by indemnities or repayments."

II.

INLAND NAVIGATION.

I. *Material.*

(a) Navigable Waterways.—In 1913 the total length of the French waterways, classed as navigable or suitable for transportation purposes, was 16,738 kilometres, of which only 11,316 kilometres were actually used for navigation.

These 11,316 kilometres consisted of :—

Rivers, streams, lakes and ponds	6,436 km.
Canals	4,830 km.

The French system of inland waterways is almost entirely administered by the State, and only a very small fraction (255 km.) has been leased to private companies.

The Law of August 5th, 1879, classified the inland waterways as main and secondary routes.

Main waterways must, under the above-mentioned law, possess mooring accommodation with a depth of at least 2 metres, and locks measuring 38,50 × 5,20 metres, while, in the case of canals, fixed bridges must leave a clear space of 3,70 metres above the ordinary water level.

The total length of navigable waterways providing mooring accommodation with a depth of 2 metres at all seasons amounted, in 1913, to 5,556 kilometres, made up as follows :—

Rivers and streams (including estuaries)	2,184 km.
Canals	3,372 km.

The total length of canalised rivers and canals equipped with locks measuring at least 38,50 × 5,20 metres amounted on the same date to 4,630 km., made up as follows :—

Canalised rivers	1,778 km.
Canals	2,852 km.

Finally, the total length of the waterways fulfilling the two conditions which are indispensable for the passage at all seasons of craft measuring 38,50 metres in length and drawing 1,30 metres amounted to 4,875 km., made up as follows :—

Rivers and streams (including estuaries)	2,128 km.
Canals	2,747 km.

Owing to the restoration to France of the waterways of Alsace and Lorraine, the entire French system of navigable waterways, including the Rhine from its junction with the Lauter as far as the Swiss frontier, now amounts to 17,400 km., of which 11,791 km. are actually used for navigation ; this total comprises :

Rivers, streams, lakes and ponds	6,543 km.
Canals	5,248 km.

The total length of waterway which should be navigable by barges *(péniches)* of 300 tons is at present 5,282 km. This total comprises :—

Rivers and streams (including estuaries)	2,205 km.
Canals	3,077 km.

Account must, however, be taken of the considerable destruction wrought by the enemy in the liberated districts. Although some remarkable reconstructive work has been accomplished, and has now almost been completed, much still remains to be done.

Out of 1,036 km. of navigable waterways which been destroyed at the time of the Armistice, 969 km. have now been reopened for navigation, and have been deepened sufficiently (although they do not always attain the minimum standard depth of 2 metres) to permit the passage of small 300-ton barges carrying a reduced cargo. Out of 1,120 structures which had been destroyed, 890 have now been repaired, including a large number of them which have been adapted for temporary use.

Moreover, work is now being carried out in order to allow the passage of 300 ton barges on :—

The Canal from the Rhone to the Rhine	186 km.	260 km.
The Orleans Canal	76 km.	

A Government order dated February 12th, 1920, included in the programme of works to be carried out, the enlargement of the two following navigable waterways, in order to admit the passage of 300-ton barges :

The Berry Canal	206 km.	380 km.
The Nivernais Canal	174 km.	

To the above must be added the Canal du Midi and its lateral canal leading to the Garonne : 433 km.

This same Government order, dated February 12th, 1920, also recommended that steps should be taken to convert a certain number of navigable waterways in order to enable them to take vessels of 600 tons ;

in this category were included the Canal du Nord and the canals connecting the Rhone with the Rhine, the Rhine with the Seine, and the lower basins of the Saar and the Rhine with the northern system of France and the port of Dunkirk.

Finally, we would mention, among the important navigational works to be carried out, the alteration in the channel of the Seine between Bougival and Rouen, which will provide mooring accommodation to a depth of 4,50 metres, and which was the subject of a Government order dated March 22nd, 1919 ; the works on the channel of the Rhone between the Swiss frontier and the sea, with the three-fold object of ensuring navigation and obtaining hydraulic force and irrigation ; and the works on the channel of the Rhine between Huningues and Strasburg, in order to obtain motive force for navigational purposes.

The inland ports which handled a traffic exceeding 10,000 tons in 1913 numbered 678 ; of these, 273 ports served rivers and 405 served canals.

The restoration to France of the system of waterways of Alsace and Lorraine has increased to about 700 the number of river and canal ports capable of handling yearly a traffic exceeding 10,000 tons. Moreover, during the war, the State established on such navigable waterways as remained in use a large number of ports—some connected and some unconnected with railways—and also provided berthing and mooring installations at these ports and furnished them with the necessary plant. Some of these works are fated to disappear with the circumstances to which they owe their existence, but the greater number of them will be maintained, in particular the 22 new railway connections (which will form an addition to the 88 connections which existed before the war) and the greater part of the loading and unloading appliances which were installed in the old ports and in the new establishments.

(b) River and Canal Craft.—The last pre-war census of river and canal craft, which was taken in 1912, showed that the French inland navigable waterways possessed 15,141 ordinary transport vessels of more than 3 tons, which collectively could carry, when fully loaded, 4,035,199 tons. The above total of vessels was made up as follows :—

Vessels of more than 300 tons	8.601
» » from 201 to 300 tons	1,913
» » from 101 to 200 tons	1,453
» » from 3 to 100 tons	3,174

As regards nationality, these vessels consisted of :—

French	12,483
Belgian	2,168
German	475
Various nationalities	15

There were, moreover, 738 mechanically propelled trading vessels, of all sorts, representing 95,296 steam h.p. ; 62 of these vessels, representing 17,021 steam h.p., were of foreign nationality.

Of these vessels 205 were normally used to carry passengers, 114 to carry goods, while 361 were used as tugs and 58 for towing purposes on a submerged chain or cable.

The Navigation Department of the Ministry of Public Works has not held a complete census of river and canal craft since the war, but in 1920 the Military Commission on Inland Navigation and Sea-ports held a census of vessels of 50 tons or more, on behalf of the War Office. This census yielded the following results for the whole of the French navigable waterways, including the three Departments of Alsace and Lorraine:—

Ordinary transport vessels of more than 5 tons: 11,265, of which 9,506 were French.

Mechanically propelled trading vessels: 734, of which 682 were French.

The first category, therefore, in comparison with the figures for 1912, shows a deficit of

15,141 — 11,265, or 4,276; of which
12,483 — 9,506 or 2,977, were French vessels.

But it should be pointed out that the statistics for the two years are not strictly comparable, for the statistics of 1912 include all vessels up to 3 tons, while those of 1920 deal only with vessels up to 50 tons. On the other hand, the 1920 census covered the navigable waterways of Alsace and Lorraine. If we deduct from the total figures for 1912 the number of vessels of from 3 to 50 tons (which may be estimated at 1,684), and if we also deduct from the total figures for 1920 the number of vessels plying on the navigable waterways of Alsace and Lorraine (which amounts to 324), it will be seen that the deficit of French vessels over 50 tons in 1920, as compared with 1914, is; 10,819 — 9, 172, or 1,647. If we add to this number the vessels of less than 50 tons and also those which were destroyed in Belgium, the deficit in the French river and canal fleet owing to the war may be estimated at 2,000 units.

As regards the second category, the pre-war figures have not been appreciably modified.

To the French inland water transport fleet should be added the barges and tugs of the Rhine, which were obtained from Germany and which have just come into French possession by virtue of Article 357 of the Treaty of Versailles, namely:

Barges:	254,150 tons.
Tugs:	23,750 hp.

The French river craft tonnage has, none the less, suffered serious losses, which have to be made good by Germany in accordance with Article 236 of the Treaty of Versailles.

2. *Traffic.*

In 1914 the French State possessed no river or canal craft used for trading.

In the course of the war the insufficiency of means of transport on the various navigable waterways, and especially on the Lower Seine and the

Seine estuary, where provision had to be made for exceptionally heavy traffic, induced the State to acquire and order the construction of a certain number of tugs. Moreover, it proved necessary, at the end of the war, to despatch to the canals of the East and North, as they gradually became fit for use, a large part of the barges which had been used on the Seine during the war, and had now become indispensable for the canals. The French State therefore gave orders for the construction of craft specially for use on the Seine in replacement of the barges taken away for other districts.

These craft, consisting of tugs and barges belonging to the State, are worked by the "Office National de la Navigation," which had in use on the Seine in 1920, 60 barges, representing a total of 24,700 horse power, and 69 tugs, representing a total tonnage of about 42,500 tons.

As regards the volume of traffic, the total tonnage of merchandise transported on the navigable French waterways amounted in 1913 to 41,896,754 tons.

For the year 1914, five months of which were affected by the war, the total was 16,267,897 tons — a reduction of 32 % in comparison with 1913, account being only taken of the traffic on the routes exploited in the zone unocupied by the enemy; this traffic amounted in 1913 to 23,944,435 tons.

The worst year was 1916, when the total was only 13,320,035 tons.

The traffic then rose progressively till 1918:

1916	15,142,350	tons.
1917	16,076,120	»
1918	17,762,538	»

This last total represents an increase of 9,1 % compared with 1914, and a reduction of 25,8 only compared with 1913.

The returns for the year 1919 showed a total of 17,202,511 tons, a little below that of 1918, in spite of the incorporation of the Alsace-Lorraine system. The figures for 1920 are not yet exactly known, but, judging from the results obtained during the three first quarters, and even allowing for a considerable reduction in the fourth quarter, the total tonnage of merchandise which will have been transported in 1920 may be estimated at about 21,500,000, which represents an increase of 32,1 % compared with 1914, and a decrease of 48,7 % compared with the total pre-war traffic of 41,896,764 tons.

It is interesting to note the considerable impulse given to navigation during the war, especially in the course of the year 1918, on the Lower Seine between Havre, Rouen and Paris. The tonnage of merchandise transported from Rouen (coming from Havre and Rouen) to Paris was in fact as follows:

1913	3,491,739	tons.
1914	3,087,509	»
1915	5,182,164	»
1916	6,206,700	»
1917	6,360,004	»

1918	3,234,700 tons.
1919	5,331,558 »
1920	3,933,352 »

At present, mainly in consequence of the reduction in the deliveries of English coal, the traffic on the Lower Seine is tending to return to the pre-war figure, though it is still a little higher.

3. *Exploitation.*

Before 1914, the State did not intervene in the exploitation of inland waterways, except in rare cases, with a view to organising and regulating haulage.

Speaking generally, navigable waterways were constructed and maintained by the State, but the material and the haulage were provided almost exclusively by private enterprise, and this also applied in regard to the exploitation, properly so called, of navigable waterways.

The exigencies created by the war, the necessity of obtaining not only good order and security of navigation, but also the greatest possible results from the craft available, induced the State, which in war time had unlimited power of requisitioning, to regulate the exploitation of navigable waterways with the greatest care, so long as hostilities lasted.

When the system of military exploitation of navigable waterways came to an end, a Decree was issued, dated December 31st, 1919, temporarily maintaining in being a certain number of war organisations and regulations, in order to permit the Government to give priority to certain transport operations which were recognised as indispensable in the interest of the country.

A Decree of November 2nd, 1920, suspended a certain number of the provisions of the Decree of December 31st, 1919, and de-controlled transportation by water. It did not, however, appear possible to dispense entirely with any regulation of the traffic, as had been done in the pre-war period, and a more recent Decree of January 11th, 1921, has established certain general rules organising the system of transport by water by virtue of the general supervisory powers possessed by the Government. This Decree lays down certain minimum conditions which have to be incerted in freight agreements and bills of lading, and provides for the creation in the principal loading centres of free freight offices, managed and administered by the interested parties.

4. *Freight.*

The fixing of freight rates, which was entirely free from control prior to 1914, has undergone a similar evolution. During the war, under the system of requisitions, obligatory freight tariffs were imposed for inland water transport. These obligatory tariffs were drawn up by the Minister of Public Works, in accordance with the views of the Advisory Committee on Inland Water Transport.

The Decree of December 31st, 1919, authorised the Minister to continue to fix the maximum charges for haulage and freight, in order to prevent the imposition of excessive tariffs, which would otherwise have resulted inevitably at a moment when the country was, in the throes of a transport crisis.

Since November 15th, 1920, freight has been de-controlled ; the object of the freight organisations provided for by the new instruction for inland waterways is to regularise and control this traffic in such a way as to prevent the abuses which frequently occurred under the conditions of absolute liberty which obtained in pre-war days.

However, in spite of all precautions, freight tariffs — being governed by general economic laws, and influenced, in certain cases, to a remarkable degree by the price of coal — have risen, and still remain raised, to prices considerably above those of 1914.

For instance, in the case of the Seine, where all vessels are towed and where, in consequence, the price of coal forms an essential element in the cost of freight, the freight from Rouen to Paris, which before the war ranged from 3.50 to 5.00 francs per ton according to the state of the water, rose progressively to an average of 6.50 francs in 1916, 9 francs in 1918, and 14 francs in 1919.

From November 1919, the rise in freight charges, which kept pace with that of the price of coal, assumed considerable dimensions. The charge amounted to 17.85 francs on November 15, 1919, 29.40 francs on December 10th, and 32 francs on February 1st, 1921.

This price remained the maximum until June 1920 ; it then fell to 24.50 francs on July 1st, 22.05 on August 1st, 20.30 francs on September 1st. It varies to-day between 15 and 17 francs, fluctuating in close conformity with the price of transport by rail.

Similar results are recorded on the canals in the Northern departments : the cost of transporting a ton of coal from Bethune to Paris, which varied from 5 to 7 francs before 1914, rose to 16 francs in 1917, to 25 francs in 1919 and to 35 francs in 1920. It has fallen at present to 25 francs, and shows a tendency to fall further, which, no doubt, will reduce it soon to the same cost as transport by rail, *i.e.*, 22 francs.

5. *Fuel.*

Inland water transport is responsible for an average annual consumption of fuel which may be estimated at about 350,000 tons, made up as follows : tug service, towing, river and canal transport.

Handling in river ports	325,000	tons.
Dredging	10,000	»
Elevating works	15,000	»

Of these 350,000 tons of fuel about four-fifths are briquettes and one-fifth coal.

Three-quarters of this fuel is imported (English briquettes).

The other quarter only consists of coal of French origin.

The pre-war prices were 30 to 35 francs a ton for coal and 20 to 34 francs a ton for briquettes, according to place of origin — the last mentioned price being that of briquettes coming from the mines of the Centre and the South.

The price of English briquettes, after having risen progressively during the years of the war up to 110 to 130 francs per ton — a rate which was maintained with a few variations in 1917, 1918 and during the first half of 1919 — advanced rapidly at the end of the same year until it reached 500 francs (or 508 francs, making allowance for a rebate of 92francs), and came down at the end of 1920 to 258 francs, allowing for the rebate. Its present net cost can be reckoned at 220 to 230 francs.

French briquettes maintained a level of between 56 to 65 francs a ton up to 1918 ; as a result of increased taxes, the cost rose to 310 or even to 365 francs in June 1920. The tax has been reduced since December 10th, 1920, and the present price varies according to the origin of the fuel. The price of coal from the mines of Northern France is at present (including increased tax) 161 francs and upwards. The coal from the Saar Valley is reckoned at 136.50 francs.

All these are pithead prices, or in the case of imported coal price at the port of delivery.

These considerable fluctuations in the price of the various coals since 1914 explain and justify the corresponding variations in the freight rates which were pointed out in the previous section.

6. *General Financial Situation.*

In spite of the really excessive rates reached by freights in the circumstances which we have just described, the French inland water transport industry passed through the period included between July 1st, 1919, and May 1st, 1920, without encountering excessive difficulties. In consequence of the general transport crisis, which was then in its acutest phase, the railways—being unable to satisfy all the demands made upon them by commerce and industry—fell back upon the waterways, which thus obtained considerable custom. But since the improvement in the conditions of transport by rail, the situation as regards inland water transport has been considerably modified and that industry has had to pass through a particularly difficult period in the course of the year 1920, especially as regards that portion of the industry which is dependent on tugs, as the high cost of this form of traction makes it impossible to compete satisfactorily with the railways, which have therefore captured a considerable part of the custom of the waterways.

The present reduction in the price of coal has made it possible, both on the Seine and the Rhine, to return to freight rates which do not exceed the cost of transport by rail ; but since then we have had to face the general economic crisis and the reduction in the importation of coal from England ; the consequence is that water transportation, like many other industries, is at this moment undergoing a serious crisis which is immobilising a considerable proportion of the river craft, and this will inevitably result in bringing about considerable reductions in freight rates.

III.

MARITIME NAVIGATION.

A. — Situation of Commercial Maritime Ports.

1. *Material.*

(a) Berthing stations (including wharves, piles and mooring buoys) in the whole of the French sea-ports) :—

Total number of stations for vessels of all sizes . . . . . . 1,100.

Number of these stations, on January 1st, 1921, capable of taking vessels drawing more than 6 metres of water . . . . 654.

Note.—Of these 654 stations for vessels drawing more than 6 metres, 184 have been constructed during the war.

(b) Plant :—

Total number of motor cranes in French ports about 2,000.

The number of motor cranes in French ports before the war was only 1,240 ; this number was increased during the war, either by the State (about 350 machines) or by the Chambers of Commerce, or firms granted a concession for public or private plant (about 550, of which about 200 were obtained second-hand from English and American sources).

French ports have been equipped during recent years with improved mechanical appliances, specially adapted for handling coal and ores *(transbordeurs)* and grain (fixed and floating elevators, " Poulsens, " etc.).

The length of railways in the ports has been increased since August 1st, 1914, by 850 kilometres, of which about 500 kilometres were laid by the French State, and 350 kilometres were obtained from English and American stocks left in the ports.

There are 69 repairing installations, including :—

33 dry docks *(formes de radoub)* ;
22 dry dock frames *(grils de carénage)* ;
10 slipways ;
4 floating docks (including two large docks of 4,200 tons, supplied by Germany).

(c) Capacity for Goods :—

Capacity of quays and sheds in ports	1,800,000 tons.
Capacity of goods depots	1,700,000 tons.
Total	3,500,000 tons.

This capacity is calculated on the basis of the maximum utilisation of space in the ports, which occurs when almost the entire available area is occupied by goods. The normal capacity of ports (as is approximately the case at the present time) is 1,000,000 tons ; when fully utilised this capacity has attained 2,500,000 tons.

2. *Traffic.*

The traffic in the forty principal French ports from 1913 to 1920 is contained in the following table :

	Goods unloaded	Goods loaded	Total
1913	31,884,516	10,412,149	42,296,665
1914	27,223,519	7,781,979	55,005,498
1915	40,155,884	5,110,019	45,265,903
1916	51,502,755	5,170,343	56,673,098
1917	45,996,589	4,590,895	50,587,484
1918	48,931,219	4,617,632	53,548,871
1919	37,625,091	5,176,438	42,801,529
1920	34,000,000	7,000,000	41,000,000 (1)

The number of passengers embarked and disembarked in 1920 was about 2,535,000.

3. *Works.*

1. *Upkeep.*—The work of construction in French ports suffered comparatively little as a direct result of hostilities, but, on the other hand, during the war and even after the Armistice, it was only possible to carry out such works for upkeep and repairs as were absolutely indispensable for the existence of the maritime establishments, and even then only so far as the difficulties connected with the supply of labour and material permitted. The first necessity was to maintain ports at the depth necessary for the reception of cargoes of military and civilian supplies, and to see that

(1) Provisional total.

the structures were maintained in repair. It was necessary to postpone work of a less urgent nature, such as the relading of piers and platforms, calendering, paving and the internal upkeep of work buildings, while even the upkeep of quay walls has often been neglected.

During the last two years a serious effort has been made to restore the ports to normal conditions, and this effort will have to continue during the coming years, in spite of the rise in the price of labour and material, which causes a considerable increase in expenditure, as is shown by the following figures. While the 1914 Budget provided for 8,500,000 francs to be devoted to the upkeep of sea-ports, this figure had to be increased in 1919 to 21,300,000 francs, and in 1920 to 35,5000,000, while in the 1921 Budget it reaches a total of 46 millions.

This last sum is made up as follows :—

Dredging operations	19	millions
Working expenses	4	»
Ordinary upkeep	11	»
Ordinary repairs	12	»

The grant for these purposes will certainly have to be maintained for several years.

2. *Works of Improvement and Extension.*—While new works of construction necessitated by the requirements of the French and Allied armies, and which were essential for the provisioning of the civilian population, were carried out throughout the war, the Government Department concerned was studying post-war requirements, and drawing up a plan of the work which would be necessary in order to enable sea-ports to cope with the traffic which was to be expected with a view to the economic development and restoration of the country.

From the date of its institution in October 1917, the Supreme Board of Public Works was instructed to draw up for each port a systematic programme of the work to be undertaken and accomplished within a period of from 15 to 20 years, with the financial aid of the Chambers of Commerce and other local bodies. The work of investigation, which was entrusted to special committees, resulted in a series of programmes being drawn up ; these seem, in their general lines, taking into consideration present-day prices, to make provision for a total of 3 milliards 300 millions, which may be summarised as follows :

Expenditure to be incurred through the completion of work already authorised by Parliament	2 milliards.
Draft laws or decrees in preparation	700 millions.
Plans in preparation	600 millions.

About half of this sum will be covered by means of contributions made by the parties concerned, who will also be called upon to advance to the State its share in the expenditure.

The expenditure foreseen for the present year amounts to 200 millions ; consequently, the time-limit for the completion of the work will be at least sixteen years.

B. — **The Fleet.**

1. *The French Mercantile Marine.*

From 1914 to 1920.

	Total tonnage.	Steamships.	Sailing Ships.
Before the War (July 31st, 1914) .	2,555,775	1,994,265	561,510
After the Armistice (December 31st, 1918)	1,886,819	1,558,547	328,272
On January 1st, 1920 :			
Private Property	2,076,963	1,758,190	318,212
State Property	452,943		
On January 1st, 1921 :			
Private Property	2,418,754	2,102,542	316,212
State Property	452,943		
Ex-German Ships	266,973		
Grand Total on January 1st, 1921 .	3,138,670		

2. *Traffic.*

(a) Shipping Services.

The shipping services are far from having regained their pre-war efficiency, even when the newly-established lines are taken into account. The approximate figures for those lines which start from the five principal ports (Dunkirk, Havre, Nantes-St. Nazaire, Bordeaux and Marseilles) are as follows :

Lines existing before the war	194
Discontinued services	63
Lines with irregular services	17
Newly created lines	48

The shipping authorities at Marseilles make the following statement in this connection :

"It must be noted that there has been no improvement since the cessation of hostilities; on the contrary, the services are being more and more reduced, especially since 1920, as, owing to the failure of the crops in Algeria, there is a slump in local shipping. The goods carried by steamer amount to hardly more than a few tons on the voyage home; the number of passengers is also gradually decreasing.

"There is no prospect of new lines being started or existing services being improved either at present or in the near future."

(See Annex I.)

(b) Passenger Traffic.

The figures for passengers who embarked in French ports are as follows:

1913	2,912,278
1920	2,535,000

Annex II gives, among others, the figures for the passenger traffic of a few of the steamship companies.

The figures for the Compagnie Générale Transatlantique, for instance, are as follows:

1913	416,971	passengers
1919	428,388	»
1920	446,861	»

The figures for the Messageries Maritimes are as follows:

1913	205,995	passengers
1919	79,196	»
1920	140,000	»

(c) Tonnage of Goods.

The figures for goods exported and imported by sea, given in maritime tons, are as follows:

	Imports	Exports	Total
1913	30,192,915	9,860,629	40,053,544
1919	32,217,133	3,116,024	35,333,157

The above totals were furnished by the Customs Administration. The first total was published in the "General Tables for Commerce and Shipping" ("Tableau général du commerce et de la navigation"), Volume 1, page 67, and the second will appear in the next number of that publication. They do not exactly correspond with the figure given in the Note from the Department for Sea-ports.

It will be some months before the figures for 1920 can be ascertained by the Customs Administration.

Another Government Department was able, however, to furnish the following information with regard to this year :

	Imports	Exports	Total
1920	33,426,600	7,072,100	40,498,700

3. *Rates.*

(a) Increase in Passenger Rates.

Only a few examples of this increase can be given. The following are the fares for first-class passages on some of the most frequented lines during the period before the war, immediately after the war and at the present time :

	1914	1918	1921
	Fr.	Fr.	Fr.
Havre-New York (Cie Générale Transatlantique)	500	665	2,900
St. Nazaire-Martinique (Cie Générale Transatlantique)	900	1,075	2,300
Marseilles-Algiers (Cie Générale Transatlantique)	100	160	300
Bordeaux-Buenos Ayres (Chargeurs Réunis.)	625	1,095	5,100
Bordeaux-Dakar	475	987	2,295
Marseilles-Saigon	1,100	1,716	3,545
Marseilles-Port-Said (Mess. Marit.) .	375	585	1,575
Marseilles-Tamatave	1,295	2,340	3,860
Marseilles-Shanghai	1,680	2,680	5,450

(See Annex II.)

(b) Increase in Goods Freights.

It is impossible to give exact figures for this increase. The following figures will serve as an example :

Place of Origin	Destination	1914	1918	1920
Australia	Great Britain	25	150	80
Saigon	Marseilles	23	500	115
Bombay	Great Britain	15-17	260	62
Bordeaux	Cardiff	5	50	8 dol.
United States of America	France	10-11	—	8 dol.
	Great Britain	—	56	—

(See Annex III).

4. *Fuel.*

(a) Total Consumption according to Nature of Fuel.

It is impossible to give the figures for the total consumption of coal or mazout of the whole mercantile marine. The total consumption may be estimated at, roughly, 3 million tons.

The figures for the total consumption of a few of the principal shipping lines are given below as an example.

	1913	1919	1920
Compagnie Transatlantique .	942,156 tons	422,367 tons	545,423 tons
Chargeurs réunis	215,700 »	167,150 »	243,000 »

(b) Origin of Fuel.

Before the war, fuel (exclusively bunker coal) was obtained principally from the United Kingdom and secondly from Belgium, Germany and France. In 1920, bunker coal was obtained mainly from the United States. At present it comes chiefly from Germany ; but also from England, Belgium and even Japan, etc.

(c) Cost Price per Ton.

The following table shows the cost price per ton paid in 1914-1918 and 1920 by French shipowners for coal at the ports of Havre, Bordeaux and Marseilles.

Port of Importation.	1914 — Large and Pit-mouth		1918 — Large and Pit-mouth	1920 — Large and Pit-mouth
Havre.	34,50	29,50	135,00	300,00
Bordeaux	34,00	30,25	166,50	270,00
Marseilles	35,00		232,50	436,50

In 1918 and 1920 there was no difference in the price of large or pit-mouth coal, because, on account of the shortage of fuel, the shipowners were obliged to take any coal they could obtain.

The figures for the year 1918 are based on the prices demanded by the Shipping Department, which, under the requisition system, was alone entitled to supply requisitioned ships.

The figures for the year 1920 show the cost price paid by shipowners, taking into account the cancellation of insurance policies by which the owners had benefited since August 12th.

The cost price of coal paid by some of the large shipping companies may be quoted here as an illustration :

	1913	1919	1920
Compagnie Transatlantique	31 fr. 30	120 fr. 55	280 fr. 42
Chargeurs réunis	32 fr. —	166 fr. —	350 fr. —

(See Annex II.)

5. *General Financial Situation.*

It has not been possible to obtain information on this matter from the companies and shipowners concerned.

The annexed note, showing the fluctuation in the price of the principal maritime securities according to the quarterly quotation in the "Illustration économique et financière" (February 1921) contains some information on this subject.

(See Annex IV.)

ANNEX I.

SHIPPING SERVICES.

Direction of Dunkirk.

Position before the war	*Position on February 1st, 1921*
1. Line from Dunkirk to Brest and from Brest to Nantes (Compagnie Chevillote).	Discontinued.
2. Line from Dunkirk to Boulogne, Saint-Malo (ditto).	
3. Regular service between Dunkirk, Le Havre, Nantes, Bordeaux, Le Havre (Compagnie Générale transatlantique).	—
4. Line from Dunkirk to Canada (ditto).	
5. Service between Dunkirk and Spain (Société Anon. des Hauts-Fournaux, Forges et Aciéries de Denain et d'Anzin).	—
6. Service between Dunkirk and Portugal (ditto).	
7. Route Dunkirk-Hamburg (Worms et Cie).	2 monthly sailings.
7 *(a)*. Line Boulogne-Brest and Bordeaux, La Rochelle-Pallice, Nantes, Bayonne and Pasages (ditto).	2 or 3 sailings per month according to tonnage.

7 *(b)*. Dunkirk, Antwerp, Danzig (Worms).	2 monthly sailings.
8. Line Boulogne, Le Havre (Bretel Frères).	Irregular.
8 *(a)*. Service Calais-Boulogne (ditto).	—
9. Line Dunkirk, Bordeaux, Marseille, Cette (in connection with lines to America and the Far East), run by other companies (Cie. des Bateaux à vapeur du Nord).	—
10. Line Dunkirk, Saint-Nazaire, with connection to America (ditto).	—
11. Line Dunkirk, Boulogne, Lorient, La Rochelle, Rochefort (ditto).	—
12. Line Dunkirk, London (ditto).	—
13. Line Dunkirk, Bayonne (ditto.)	—
14. Line Dunkerque, Algeria (ditto).	—
15. Line Dunkirk, Tunis (ditto).	—
16. Line Dunkirk, Le Havre (ditto).	—
17. Line Dunkirk, Hamburg (ditto).	—
18. Direct service Dunkirk, Caen, Cherbourg (Cie. des Bateaux à vapeur du Nord).	Irregular.
19. Line Dunkirk, Haïphong and Saïgon (ditto).	—
20. Regular service Dunkirk, Antwerp (ditto).	—

21. Line Dunkerque, Buenos Ayres (fast) (Chargeurs réunis).	1 or 2 sailings per month.
22. ditto (Direct).	Suspended.
23. Line Brazil 1, from Dunkirk, Line Brazil 2, (ditto).	1 or 2 sailings per month.
24. Line to the West Coast of Africa from Dunkirk (ditto).	1 sailing per month.
25. Line to Indo-China (ditto).	1 sailing per month.
26. Regular Service from Dunkirk to Rotterdam (Cie. franço-néerlandaise de navigation à vapeur).	1 weekly sailing.
27. Daily postal service by French mail steamer from Calais to Dover (Cie. du Chemin de fer du Nord).	Re-established on August 9th, 1920.
28. Line Dunkirk, Algeria (Compagnie havraise péninsulaire)	Irregular.
29. Line Antwerp, Calais, Sydney, Tahiti (Cie. nationale de l'Océanie) (has never called at Calais).	Not yet in existence.
30. Regular service Dunkirk, Boulogne, Caen (Cie. normande de navigation à vapeur).	A single ship from Boulogne to Caen.
31. Regular service Dunkirk to Senegal (Ligne Charles Scholl).	Discontinued.
32. Regular line Dunkirk, Bayonne (Ligne H. Julia et Cie).	—
33. Line Dunkirk, Copenhagen and Baltic Ports (Cie. Française à vapeur "France-Baltique").	1 sailing per month.

Direction of Havre.

Position before the war.	*Position on February 1st, 1921.*
1. Line from Havre to Indo-China and Japan (Messageries Maritimes).	Irregular.
1 (*a*). Le Havre-Marseille (ditto).	—
2. Line Le Havre, Brest (Chevillote).	Discontinued.
3. Line Le Havre to Lorient and Nantes (ditto).	—
4. Regular service from Rouen to Morocco (Transp. maritimes Paris, Rouen, Maroc).	—
5. Line Le Havre-Morocco (Cie. Générale trans.).	Regular service.
6. Line Le Havre-Canada (ditto).	—
7. Line Le Havre-New York (ditto).	—
8. Line Le Havre-Fort de France and Colon (ditto).	—
9. Line Le Havre-Mexico (ditto).	—
10. Line Le Havre-Tahiti (ditto)	Established since the war.
11. Line Le Havre-South Pacific (ditto).	—
12. Line Rouen-Bordeaux (Worms & Cie.).	Amalgamated with the Service Le Havre-Bordeaux.
13. Service Rouen-Pasages (ditto)	Discontinued.
14. Service Rouen-Bayonne and La Rochelle (ditto).	—

15. Service Rouen-Dunkirk (Worms et Cie.)	Discontinued.
16. Service Rouen-Brest-Nantes (ditto).	—
17. Service Rouen-Lorient (ditto).	—
18. Service Rouen-Hamburg (ditto)	—
19. Service Rouen-Rotterdam (ditto).	Replaced by the service Le Havre-Rotterdam.
20. Service Le Havre-Bordeaux (ditto).	Continued.
21. Service Le Havre-Hamburg	Discontinued.
22. Service Le Havre Bremen (ditto)	—
23. Service Le Havre-Brest (ditto).	—
24. Service Le Havre-La Rochelle (ditto).	—
25. Service Le Havre-Bayonne (ditto).	—
26. Service Le Havre-Pasages (ditto).	—
27. Service Le Havre-Nantes (ditto).	Discontinued.
28. Service Le Havre-Lorient (ditto).	—
29. Service Dieppe-Grimsby (ditto)	Continued.
30. Service Le Havre-Cherbourg (Bretel Frères).	—
31. Service Le Havre St.-Vaast (ditto).	Discontinued.
32. — Le Havre-Calais (ditto).	Continued.
33. Line Le Havre, West Coast of Africa Postal Service (Chargeurs réunis)	Discontinued.

34. Line Le Havre, West Coast of Africa, Commercial service (Chargeurs réunis).	Continued.
35. Line Le Havre-Indo-China (ditto).	—
36. Regular service from Rouen to Algeria and Tunis (Lignes Conseil, Société des Affréteurs réunis).	—
37. Regular line between Algeria, Spain and Rouen-Paris (Le Qualles et Fils).	Discontinued.
38. Service from Tréport to London (Ser. maritimes du Tréport).	—
39. Service from Tréport to various English ports. (ditto).	—
40. Line Le Havre, Morocco and Algeria (Société navale de l'Ouest).	—
41. Line Le Havre-Madeira (ditto).	—
42. Line Le Havre-Lisbon (ditto).	Service continued.
43. Line Le Havre, Barcelona, Marseilles (ditto).	Service continued.
44. Line Le Havre, Madagascar, Mauritius, La Réunion (Cie. havraise péninsul.).	Slower service.
45. Line Le Havre-Algeria.	—
46. Coal Transport Le Havre. (Delmas frère).	Discontinued.
47. Regular service Le Havre-Caen (Cie. normande de navigation à vapeur).	Continued; also the services Le Havre-Honfleur and Le Havre-Trouville.
48. Line Le Havre-Saint-Malo (regular service Le Havre-Saint-Malo) (Le Gualès de Mèzaubran).	Irregular.

49. Line Le Havre-Paris (Cie. générale de navigation Seine).	Discontinued (Lloyd Séquanais).
50. Line Le Havre-Morlaix (Cie. des paquebots à vapeur du Finistère).	Discontinued.
51. Service from Carteret to Jersey (Cie. rouennaise de navigation).	—
52. Service from Rouen to Havre (ditto).	—
	53. Le Havre-Bristol (Worms).
	54. Le Havre-Brazil (Chargeurs réunis).
	55. Le Havre-La Plata (ditto).
	56. Le Havre-Portugal-Mediterranean (Société navale de l'Ouest).
	57. Le Havre-Eastern Mediterranean (ditto).
	58. Le Havre-West Africa (ditto).
	59. Le Havre-Antwerp (ditto).
	60. Le Havre-Marseilles (Cie. Havraise péninsulaire).
	61. Le Havre-Madagascar (ditto).

Direction of Nantes.

Position before the war.	*Position on February 1st, 1921.*
1. Service from Lorient to Brest (Chevillotte frères).	Discontinued.
2. Service from Nantes to Brest (ditto).	--

3. Service from Nantes to Algiers and Oran (Chevillotte frères).	—
4. Service from Lorient to Algiers and Oran (ditto).	—
5. Service from Nantes to Saint-Nazaire, Bordeaux, Tangiers, Gibraltar, Algeria, Tunis (Cie. générale transatlantique).	Continued.
6. Service from Nantes to Casablanca (ditto).	Continued.
7. Service from Nantes to Saint-Nazaire, Bordeaux, La Pallice (ditto).	Discontinued.
8. Service from Nantes to London (ditto).	Continued.
9. Service from Nantes to Liverpool (ditto).	—
10. Line from Saint-Nazaire to the Antilles and Central America (ditto).	—
11. Line from Saint-Nazaire to Santander, Le Havre and Vera Cruz (ditto).	—
12. Service from Nantes to Bordeaux (Worms et Cie.).	Nantes is no longer the chief por of the line.
13. Service from Nantes to Hamburg (ditto).	— —
14. Service from Nantes to Bayonne (ditto).	— —
15. Service from Nantes to Pasages (ditto).	— —
16. Line from Nantes to Bastia (ditto).	— —

17. Coal transport between Bristol and Nantes, Bristol and Saint-Nazaire (Ligne Delmas frères).	Discontinued.
18. Regular service from Nantes to Guiana (Cie. nantaise de navigation à vapeur).	Discontinued.
19. Traffic between Lorient, Cardiff, Newport, Swansea, Port Talbot (Sté. Marecesche et Cie.).	Services continued.
20. Coal transport between Lorient, Cardiff, Newport, Swansea, Barry Docks, Port Talbot, (Stéf. Le Brise, Bois et charbons).	— —

Direction of Bordeaux.

Position before the war.	*Position on February 1st, 1921.*
1. Line from Bordeaux to Algiers and Oran (Chevillotte frères).	Discontinued.
2. Line Morocco, Bordeaux, Casablanca (Cie. générale transatlantique).	Service continued.
3. Line Bordeaux-London (ditto).	Discontinued.
4. Line Bordeaux-New York (ditto).	Service continued.
5. Line Bordeaux-Pauillac to Fort de France and Colon (ditto).	Starts from Le Havre.
6. Line from Bordeaux to Havanna, Vera Cruz, New Orleans (Cie. gén. trans.).	Replaced by the Bordeaux-Baltimore line.
7. Line from Bordeaux to Las Palmas, Havanna, New Orleans (ditto).	Discontinued.

8. Service from Bordeaux to Havre (Worms et Cie.).	Continued.
9. Service from Bordeaux to Rouen (ditto).	—
10. Service from Bordeaux to Nantes (ditto).	—
11. Service from Bordeaux to Bayonne (ditto).	—
12. Service from Bordeaux to Pasages (ditto).	—
13. Service from Bordeaux to Antwerp (ditto).	—
14. Service from Bordeaux to Hamburg (ditto).	—
15. Service from Bordeaux to Bremen (ditto).	Discontinued.
16. Service from Bordeaux to Dunkirk and Boulogne (ditto).	Continued.
17. Service from Bordeaux to Brest (ditto).	—
18. Service from Bordeaux to La Rochelle-La Pallice (ditto).	—
19. Line La Pallice-Dakar, Montevideo, Buenos Ayres (Chargeurs réunis).	Services continued.
20. Line Bordeaux-Pauillac to Dakar, Konakry, Grand Bassam Postal service Cotonou, Matadi (ditto).	—
21. Line Bordeaux-Pauillac, Senegal, Guinea, Ivory Coast, Dahomey (Gabon).	—
22. Line Bordeaux-Pauillac-Indo-China (ditto).	Starts from Dunkirk.

23. Mail service Bordeaux-Dakar-Buenos Ayres (Cie. de navigation Sud-Atlant.).	Service continued.
24. Commercial line Bordeaux-Dakar, Pernambuco-Buenos Ayres, Bordeaux-Dakar, Bahia, Buenos Ayres (ditto).	—
25. Service from Bordeaux to Gorée, Dakar, the Sudan (Ligne Pascal, Buhan et Cie.).	Discontinued.
26. Service between Bordeaux and the African Coast (Ligne Deves, Chaumet et Cie.).	Re-established.
27. Service between La Rochelle, Bordeaux, Morocco, Algeria and Tunis (Ligne Delmas Frères).	Discontinued.
28. Transport of coal between Bristol and La Rochelle, Bordeaux (ditto).	Discontinued.
29. Line Antwerp, Calais, Bordeaux to Sydney, Tahiti, Numea (Cie. générale de l'Océanie).	—
30. Service from Bordeaux to Gorée Dakar, Gambia and the Sudan (Ligne Maurel et Prom).	Continued.
31. Service Bordeaux-Senegal (Ligne Charles Scholl).	—
32. Service Bordeaux-Morlaix and Saint Brieuc (regular service) (Le Gualès de Mézaubran).	Discontinued.
33. Service Bordeaux, Jersey, Guernsey, Plymouth (ditto).	—
34. Service from Bordeaux and La Rochelle to Copenhagen and other Baltic ports (Cie. française de Bateaux à vapeur France-Baltique).	Service to Copenhagen only.

35. Bordeaux-Liverpool (Cie, générale transatlantique).

36. Bordeaux to the Antilles and Guiana (ditto).

37. Bordeaux-Montreal (ditto).

38. La Pallice-Le Havre, Boulogne-Dunkirk, Antwerp, Rotterdam-Danzig and vice versa (Worms et Cie.).

39. La Pallice-Bordeaux and vice versa (ditto).

40. Bordeaux-Danzig (ditto).

41. La Pallice-St. Nazaire and Nantes and vice versa (Messageries de l'Ouest).

42. La Pallice Algiers-Oran-Tunis and vice versa (Société nationale de l'Ouest).

43. Coasting trade between French ports (Leridon, shipowner at La Rochelle).

44. Coasting trade between French ports (Faustin, shipowner at La Rochelle).

45. From La Rochelle to English ports and vice versa (Delmas et Vieljeux, shipowners at La Rochelle).

46. From La Pallice to Iquique and vice versa (Cie. française d'armement et d'importation de nitrates de soude).

47. Service Bordeaux-Spain (Société des affréteurs réunis).

48. Service Bordeaux - Portugal (Société des affrétteurs réunis).
49. Service Bordeaux-Algeria-Tunis (ditto).
50. Service Bordeaux to the Canaries (ditto).
51. Service Bordeaux-Levant (ditto).
52. Service Bordeaux-Morocco (Cie. des vapeurs français).
53. Service Bordeaux-Spain (Henri Julia et Cie., shipowners at Bayonne).

Direction of Marseilles.

SUBSIDISED LINES.

Position before the war.	*Position on February 1st, 1921*
1. Marseilles - Haiphong every 4 weeks (Messageries maritimes).	Service continued.
2. Marseilles - Yokohama (every 2 weeks) (ditto).	—
3. Marseilles - Australia - New Caledonia (every 4 weeks) (ditto).	—
4. Marseille s- Zanzibar - Madagascar (every 4 weeks) (ditto)	—
5. Marseilles - Aden - Madagascar (every 4 weeks) (ditto).	—
6. Marseilles - Constantinople - Beirut (every 2 weeks) (ditto).	Continued.

7. Marseilles - Alexandria - Beirut (every 2 weeks) (Messageries maritimes).	Continued.
8. Marseilles - Alexandria - Beirut (every 2 weeks) (ditto).	—
9. Marseilles - Oran (weekly) (Compagnie transatlantique).	—
10. Marseilles - Oran - Carthagena (weekly) (ditto).	Discontinued.
11. Marseilles - Oran (weekly) (Transports maritimes).	Continued.
12. Marseilles - Algiers (weekly) (Transatlantique).	—
13. Marseilles - Algiers (weekly) (ditto).	—
14. Marseilles - Algiers (weekly) (ditto).	—
15. Marseilles - Algiers (weekly) (ditto).	—
16. Marseilles - Philippeville - Bône (weekly) (ditto).	—
17. Marseilles - Philippeville (weekly).	—
18. Marseilles - Philippeville - Bone (weekly) (Transatlantique).	—
19. Marseilles - Bougie - Algiers (weekly) (Transatlantique).	Discontinued.
20. Marseilles - Tunis (weekly) (ditto).	—
21. Marseilles - Tunis (weekly) (ditto).	—
22. Marseilles - Bizerta - Tunis - Malta (weekly) (ditto).	—
23. Marseilles - Ajaccio (weekly) (Fraissinet).	Continued.

24. Marseilles - Ajaccio (weekly) (Fraissinet).	Continued.
25. Marseilles - Toulon - Calvi (weekly) (ditto).	—
26. Marseilles - Bastia (weekly) (ditto).	—
27. Marseilles - Bastia (weekly) (ditto).	—

NON-SUBSIDISED LINES.

Position before the war.	*Position on February 1st, 1921.*
1. Marseilles - Le Havre - London (Messageries maritimes).	Continued.
2. Antwerp - Marseilles - Far East (ditto).	Discontinued.
3. Marseilles - Batum (ditto).	Continued.
4. Marseilles - Odessa (ditto).	Continued as far as Roumania.
5. Marseilles - New York fast service (Compagnie Cyprien Fabre).	Continued.
6. Marseilles - New York commercial service (ditto).	—
7. Marseilles - New York mixed service (ditto).	—
8. Marseilles - Cotonu (ditto).	—
9. Marseilles-Buenos Ayres packet boat (Transports maritimes à vapeur).	—
10. Marseilles - Buenos Ayres, cargoes (ditto).	—
11. Marseilles - Buenos Ayres (France-America).	Discontinued.

12. Marseilles - Ægean Sea (Compagnie Fraissinet).	—
13. Marseilles - Black Sea - Danube (ditto).	Continued.
14. Marseilles - Dahomey (ditto).	—
15. Marseilles - Black Sea (Compagnie Paquet).	—
16. Marseilles - Casablanca (ditto).	—
17. Marseilles - Port Vendres (Compagnie Touache).	—
18. Marseilles - Dunkirk (ditto).	Discontinued.
19. Marseilles - Mediterranean - Baltic (Frisch & C^{ie}).	—
20. Marseilles - New York (Vimont & Cie.).	Discontinued.
21. Marseilles - Costanza (ditto).	—
22. Marseilles - Port Vendres - Mentone (coastal transport).	Discontinued as regards Mentone.
23. Marseilles - Tunis (Daher & Compagnie).	Discontinued.
24. Marseilles - Agde - Cannes (Sicard).	Continued.
25. Marseilles - Monaco - St. Tropez (ditto).	Continued as far as Genoa.
26. Marseilles - Rabat (ditto).	Discontinued.
27. Marseilles - Port de Bouc (Compagnie navigation côtière).	—

28. Marseilles - Algiers (Société maritime nationale).

29. Marseilles - Oran (ditto).

30. Marseilles - Algiers - Oran (Affréteurs réunis).

31. Marseilles - Cette - Bône (Transports maritimes).

32. Marseilles - Philippeville - Bône (Société maritime nationale).

33. Marseilles - Bougie - Philippeville (Transports maritimes).

34. Marseilles - Tunis (Compagnie mixte).

35. Marseilles - Tunis (Société maritime nationale).

36. Marseilles - Alexandria - Beirut (Affréteurs réunis).

37. Marseilles - Dakar (Maurel & Prom).

38. Marseilles - Morocco - Dakar (Paquet).

39. Marseilles - Casablanca - Dakar (Affréteurs réunis).

40. Marseilles - Kenitra (Société maritime nationale).

ANNEX II.

COMPAGNIE GÉNÉRALE TRANSATLANTIQUE.

Average Price of Passages according to Classes.

		July 1914	December 1918	January 1921
Havre-New York..........	1st class...	500	665	2,900
	2nd „ ...	325	400	1,900
(Savoy-Lorraine)..........	3rd „ ...	130	170	
St. Nazaire-Martinique......	1st class...	900	1,075	2,300
	2nd „ ...	600	685	1,325
	3rd „ ...	375	500	
St. Nazaire-Colon..........	1st class...	1,000	1,200	3,100
	2nd „ ...	650	760	1,600
	3rd „ ...	400	530	
St. Nazaire-Vera Cruz......	1st class...	1,200	1,400	3,600
	2nd „ ...	675	850	2,100
	3rd „ ...	350	425	
Havre-Hayti.............	1st class...	875	800	
	2nd „ ...	450	450	
	3rd „ ...	300	300	
Nantes-Bordeaux-Casablanca.	1st class...	140	200	615
	2nd „ ...	110	150	435
	3rd „ ...	70	100	285
Marseilles-Algiers..........	1st class...	100	160	300
	2nd „ ...	72	115	210
	3rd „ ...	38	60	110

ANNEX II *(continued)*.

COMPAGNIE GÉNÉRALE TRANSATLANTIQUE *(contd.)*

Tonnage of Goods.

Lines	Tons of Freight					
	Export			Import		
	1913	1919	1920	1913	1919	1920
North America	225,000	103,542	125,413	416,738	760,409	1,021,389
Antilles and Central America	90,165	24,364	36,529	113,737	42,332	19,799
Algeria	341,697	140,284	186,029	387,871	247,137	125,941
Morocco	25,222	28,701	47,184	9,382	29,493	19,900

Passenger Traffic.

Lines	Passengers					
	From France			To France		
	1913	1919	1920	1913	1919	1920
North America	98,877	52,151	79,511	46,057	61,191	29,634
Antilles and Central America	23,039	20,483	23,930	21,049	13,772	19,152
Algeria	100,055	139,385	145,247	94,768	102,475	127,271
Morocco	18,537	19,927	13,801	14,589	19,004	8,315

Annex II *(continued).*

COMPAGNIE GÉNÉRALE TRANSATLANTIQUE *(continued).*

Average Rate of Freights.

Name of Lines	In July 1914		In December 1918		In January 1921	
	Freight per ton		Freight per ton		Freight per ton	
	Export	Import	Export	Import	Export	Import
North America .	30 fr.	$ 6	67 fr.	$ 76	86 fr.	$ 12
Antilles and Central America .	62 »	shil. 50	87.35	nil	135 »	shil. 150
Algeria	35 »	fr. 30	62.50	fr. 100	112 »	fr. 72
Morocco	40 »	» 40	70 fr.	» 120	130 »	» 105

Coal.

	1913	1919	1920
Total consumption	942,156 tons	422,367 tons 62	555,423 tons 767
English coal ...	535,379 tons	201,527 tons 62	133,192 tons 129
American coal .	370,744 »	220,780 »	421,167 » 593
French coal ...	6,778 »	—	—
German coal...	29,255 »	—	2,064 tons 045
Average price per ton (in the bunker)	31 fr. 20	120 fr. 55	280 fr. 42 (exclusive of cancellations)

Mineral Oil — Nil.

Annex II *(continued)*.

COMPAGNIE DES CHARGEURS RÉUNIS.

Statistical Returns of Passengers carried on the Brazil-La Plata Lines in 1919-1920.

	Going.				Returning.			
	1st Cl.	2nd Cl.	3rd. Cl.	Steerage.	1st Cl.	2nd Cl.	3rd Cl.	Steerage.
Chargeurs réunis 1919....	797		682	20,968	498		600	2,121
Chargeurs réunis 1920....	1,165		598	6,592	1,777		640	3,486
Cie. Sud Atlant.								
1919.......	1,962		1,280	27,560	2,266		1,240	5,607
1920.......	984	664	758	9,337	752	583	591	1,393
1921.......	1,112	797	821	6,754	762	485	541	2,566

Statistical Returns of Passengers carried on the Indo-China Line.

	Going.					Returning.				
	1st Cl.	2nd Cl.	3rd Cl.	Steerage.	Deck.	1st Cl.	2nd Cl.	3rd Cl.	Steerage.	Deck
1919	460	699	31	11,737	1,737	547	432	282	2,439	37
1920	222	372		6,590	107	251	270		661	16
	682	1,071	31	18,327	1,844	798	702	282	3,100	53

ANNEX II *(continued).*

COMPAGNIE DES CHARGEURS RÉUNIS *(continued).*

Statistical Returns of Passengers carried on the West Coast of Africa Line.

	Going.					Returning.				
	1st Cl.	2nd Cl.	3rd Cl.	Steerage.	Deck.	1st Cl.	2nd Cl.	3rd Cl.	Steerage.	Deck.
1919	1,357	726	902	3,414	14,276	1,106	568	833	278	6,010
1920	1,126	692	853	712	6,804	807	436	591	2,761	6,715
	2,483	1,418	1,755	4,126	21,080	1,913	1,004	1,424	3,039	12,725

Tonnage of Goods Carried.

Chargeurs réunis.

In 1913 : 1,076,000 cubic metres.
In 1919 : 572,000 ,, (plus 12 voyages made under the general requisitions system).
In 1920 : 900,000 ,, approximately.

Compagnie Sud-Atlantique.

No data with regard to 1913.
In 1919 : 1270,00 cubic metres (plus 18 voyages made under the general requisitions system).
In 1920 : 120,000 ,, approximately.

ANNEX II *(continued).*

COMPAGNIE DES CHARGEURS REUNIS *(continued).*

Passages.

Date.	Port of Embarkation.	Port of Destination.	Chargeurs Réunis.			Sud-Atlantique.		
			1st Class.	2nd Class.	3rd Class.	1st Class.	2nd Class.	3rd Class.
		Line Braxil-La Plata.						
July 1914.	Pauillac.	Buenos Ayres.	625	—	—	715	525	200
» »	»	Rio de Janeiro.	625	—	—	700	525	200
Dec. 1919.	Pauillac.	Buenos Ayres.	1,095	890	415	1,095	890	415
» »	»	Rio de Janeiro.	995	725	415	995	725	415
Jan. 1921.	Bordeaux.	Buenos Ayres.	5,100	—	1,700	5,100	2,800	1,700
» »	»	Rio de Janeiro.	4,550	—	1,700	4,550	2,300	1,700
		West Coast of Africa Line.						
July 1914.	Bordeaux.	Dakar.	475	350	200	—	—	—
» »	»	Matadi.	1,025	830	450	—	—	—
Dec. 1918.	Bordeaux.	Dakar.	987	742	420	—	—	—
» »	»	Matadi.	1,631	1,372	896	—	—	—
Jan. 1921.	Bordeaux.	Dakar.	2,295	1,835	1,025	—	—	—
» »	»	Matadi.	4,150	3,325	1,890	—	—	—
		Indo-China Line.						
July 1914.	Marseilles.	Saïgon.	1,100	550	—	—	—	—
Dec. 1918.	Marseilles.	Saïgon.	1,716	858	—	—	—	—
Jan. 1921.	Marseilles.	Saïgon.	3,545	1,590	—	—	—	—

ANNEX II *(continued)*.

COMPAGNIE DES CHARGEURS RÉUNIS.

Freights.

Line Brazil-La Plata.

Goods.	Port of Embarkation.	Port of Destination.	Rate of Freights (in francs)		
			In July 1914.	In December 1918.	In January 1921.
Iron.	Havre.	Buenos Ayres.	35,—+10%	25+10%+100%	90+10%+75%
Cement	—	—	30,—+ »	34+ » + »	90+10%
Furniture	—	—	30,—+ »	40+ » + »	90+10%+75%
Cloth, Woollen . . .	—	—	55,—+ »	65+ » + »	135+ » + »
Cotton.	—	—	45,—+ »	55+ » + »	105+ » + »
Silk.	—	—	55,—+ »	100+ » + »	165+ » + »
Iron.	Havre.	Rio Janeiro.	47,50+10%	30+10%+100%	90+10%+75%
Cement	—	—	47,50+ »	40+ » + »	100+10%
Furniture.	—	—	47,50+ »	45+ » + »	90+10%+75%
Cloth, Woollen . .	—	—	57,50+ »	65+ » + »	90+ » + »
Cotton.	—	—	57,50+ »	65+ » + »	90+ » + »
Silk.	—	—	57,50+ »	125+ » + »	175+ » + »

West Coast of Africa.

Iron	Bordeaux.	Dakar.	27,— +10 %	27+10 %+ 50 %	120
Cement	—	—	27,— + »	27+ » + »	105
Furniture.	—	—	30,— + »	30+ » + »	135
Cloth	—	—	30,— + »	30+ » + »	170
Iron	—	Matadi.	50,— + »	50+ » + »	230
Cement	—	—	50,— + »	50+ » + »	200
Furniture.	—	—	60,— + »	60+ » + »	240
Cloth	—	—	60,— + »	60+ » + »	280

Indo-China Line.

Iron	Marseilles.	Saigon.	45,—	70+10%+ 50 %	165+10 %
Cement	—	—	23,50	50+ » + »	130+ »
Furniture.	—	—	48,—	85+ » + »	180+ »
Woollen, Cloth . . .	—	—	65,—	85+ » + »	180+ »

ANNEX II *(Continued).*

COMPAGNIE DES CHARGEURS RÉUNIS *(Continued).*

Total Consumption and Cost of Bunker Coal.

1913	215,700 tons	=	7,000,000	32	fr.
1919	167,150 »	=	27,800,000	166	»
1920	243,000 »	=	85,000,000	350	»

COMPAGNIE DES MESSAGERIES MARITIMES.

Data furnished for the information of the General Conference on Communications and Transit at Barcelona by the Ministry for Public Works, Department for the Mercantile Marine, Ports and Fisheries, at the request of the Under-Secretary of State, under date of January 24th, 1920.

1. Passenger Traffic

1913	205,995
1919	79,196
1920	140,000

2. Tonnage of Goods in tons of 1,000 kgs.

1913	1,018,092
1919	207,140
1920	433,260

3. Cost of Passengers' Fares starting from Marseilles.

From Marseilles to	In July 1914				In December 1915				In January 1921			
	1st Cl.	2nd Cl.	3rd Cl.	4th Cl.	1st Cl.	2nd Cl.	3rd Cl.	4th Cl.	1st Cl.	2nd Cl.	3rd Cl.	4th Cl.
				without Board				without Board				without Board
Port Said	375	250	180	95	585	390	233	140	1,575	1,060	630	430
Constantinople	285	185	110	50	—	—	—	—	1,155	715	440	200
Tamatave	1,295	910	480	865	2,340	1,560	780	455	3,860	2,575	1,420	835
Saigon	1,625	1,100	550	287	2,535	1,715	860	450	5,020	3,545	1,665	800
Shanghai	1,680	1,155	605	298	2,680	1,800	1,040	450	5,450	3,960	1,925	845

4. **Freight of Goods per ton of 1,000 kilogrammes or per cubic metre of the ship's capacity.**

	July 1914	Dec. 1918	Jan. 1921
	Francs	Francs	Francs
France Madagascar (Tamatave)	66	148,50	198
— Shanghai	93,50	148,50	214,50
— Saigon	11	148,50	198
— Egypt	66	115,50	159,50
Madagascar France	50	200	250
Shanghai —	45	500	250
Saigon —	40	400	150
Egypt —	40	160 per Allied cargo-boats and Allied mixed steamers. 240 frs. per neutral vessel and steamer.	7 Egyptian £

ANNEX III.

FLUCTUATIONS IN THE RATE OF FREIGHTS FROM 1914 TO 1920.

1. **Pre-war Period (first six months of 1914).**

Origin	Destination	Rate of Freights.
England	Black Sea	7 -/
Hamburg	—	7 -/
La Plata	London	8 - 9-/
Bombay	Great Britain	15 -/ to 17-/
Australia	—	25 -/
Saigon	Marseilles	23 -/
Southern Ports	French Channel Ports.	4 -/
—	French Ocean	4 to 5 fr.
Bordeaux	Cardiff	5 -/
East Coast	Bordeaux	5 -/
Newcastle	Singapore	12 -/
Cuba	Marseilles	13 -/
Rotterdam	Algiers-Marseilles	7 to 8 fr.
United States	France	10 - to 11 -/

The average rate of freights varied little during the first months of 1914. The fluctuations observed are not very marked and there is little difference between the averages for the first six months.

2. Fluctuations in the Rate of Freights at the time of the Armistice.

(Last quarter of 1918.)

Origin.	Destination.	Rate of Freights.	Observations.
	October.		
Bordeaux	Bristol	17-/	
Bayonne	Bristol	20-/	
Southern Ports	Havre	45 to 50-/	Neutral tonnage. Includ. war risks (Allied tonnage).
—	Rouen		
—	Brest		
—	Bordeaux	69-/	
—	Brest	23-/	
—	Saint-Malo	17-/	
	November.		
Bristol	Bordeaux	17-/	
—	Bayonne	20-/	
Southern Ports	Rouen	45 to 50-/	Neutral tonnage
—	Caen		
—	Saint-Malo		
—	Brest		
East Coast	French Channel Ports	80-/	End of November
Mersey	Bordeaux	67-/	
	December.		
Bordeaux	Bristol	16-/	
Bayonne	—	19-/	
Southern Ports	Rouen	35- to 40-/	Neutral tonnage
—	Le Havre		
—	Saint-Malo		
—	Brest	15- to 20-/	Allied tonnage
—	Saint-Malo		
—	Honfleur		
East Coast	Rouen	4-/	19th December

There is little difference in the average rate of freights between October and November. In December they show a downward tendency. There is a marked difference between the rates charged for Allied and for neutral tonnage.

According to the *Daily Freight*, the rate of freights for the Far East, Australia and the United States, during the same period was as follows:—

Origin.	Destination.	Rate of Freights.	Observations.
Australia	Great Britain	150-/	Nov.-December.
Saigon	Marseilles	500-/	—
Bombay	Great Britain	260-/	—
United States	Great Britain	56-/	—

3. **Fluctuations in the Rate of Freights at the End of 1920.**

Tyne	Rouen	25-/	October
—	—	12-/	December
Cardiff	Bordeaux	27-/	November
—	—	15- ot 17-/	December
—	—	7- to 8-/	January 1st
—	Marseilles	25- to 30-/	November
—	—	15- to 17-/	End of December
—	Lisbon	35- to 40-/	October
—	—	25- to 30-/	November
—	—	12- to 17-/	December
Saigon	Antwerp	112-/	October
Bombay	Great Britain	62-/	November
Saigon	Marseilles	115-/	October
—	Danzig	125-/	November
Karachi	Marseilles	77,6-/	November
—	Great Britain	42,6-/	December
—	—	30-/	January
Rosario	Continent	95-/	October
Buenos-Ayres	—	90-/	October
Rosario	—	70-/	November
—	—	45- to 50-/	December
Tyne	Buenos Ayres	15-/	January
United States	French Atlantic	14 $	October
—	—	9 $ 50	November
—	—	8 $ 50	December
Australia	Great Britain	150-/	October
—	—	135-/	November
—	—	80-/	December

In view of the economic crisis (the decrease in demand), it is impossible to determine averages giving an exact idea of the situation.

The preceding figures may, however, serve as an indication of the actual state of affairs.

We give below a comparative table of the freights obtaining in 1914, 1918 and 1920 on the main routes. These figures must be considered merely as general indications and not as accurate averages, since the state of the market in 1918, and particularly at the end of 1920, made it impossible to establish accurate averages in a sufficient number of cases.

Origin.	Destination.	Rate of Freights.			Observations.
		1914	1918	1920	
Australia	Great Britain	25-/	150-/	80-/	December
Saigon	Marseilles	23-/	500-/	115-/	October
Bombay	Great Britain	5-/	50-/	8-/	December
Bordeaux	Cardiff	15 to 17-/	260-/	62-/	November
United States	France	10 to 11-/	»	$ 8	December
United States	Great Britain		56-/		

4. Fluctuations in the Rates for chartering Vessels on Time Charter.

The following are the averages of the rates for chartering vessels on time charter for the three periods under consideration :—

Year 1914	4/-58
Last Quarter 1918.	49/-
Last Quarter 1920.	18/-4

The averages for the end of 1920 are evidence of the serious crisis in freights, the consequences of which have already been shown in the figures given for chartering.

The average for the last three months of 1920 is 18/-4, while the average for December alone is 11/-3.

5. Cost Price of Bunker Coal.

The following table shows the cost price per ton paid by French shipowners for bunker coal in the ports of Havre, Bordeaux and Marseilles in 1914, in the last quarter of 1918 and at the end of 1920.

Port of Importation.	1914		1918	1920
	Large.	Pit-mouth	Large or Pit-mouth.	Large or Pit-mouth.
Le Havre	34,50	29,50	135,00	300,00
Bordeaux	34,00	30,25	166,50	270,00
Marseilles	35,00		232,50	436,50

Observations.

1. In the figures for 1918 and 1920 we have classed the two categories of coal—large and pit-mouth—together. At that time, when the shortage of fuel was acute, shipowners bought any coal which was obtainable in the market.

2. The prices for 1918 are based on those demanded by the Shipping Department ; under the requisitions system, this department alone had the right to supply the requisitioned ships with coal.

3. It must be noted that the figures for 1920 represent the cost price paid by the shipowners, cancellations of policies by which the owners had benefited since August 1st being included in the reckoning.

Annex IV

LIST OF PRICES QUOTED ON THE PARIS BOURSE

Name of Security	Rate on January 1917	Rate in 1919		Rate in 1920	
		Lower	Higher	Lower	Higher
Sea and River Transport:					
Affréteurs réunis	728	—	—	625	1,130
Auxiliaire de Navigation	500	—	—	490	1,450
Bateaux parisiens	315	200	269	208	288
Cargos français	222	—	—	320	1,150
Chargeurs d'Extrême Orient	436	—	—	380	970
Chargeurs d'Extrême Orient (parts)	74	—	—	66	250
Chargeurs réunis	890	1,201	2,150	888	2,700
Chargeurs réunis (Part de fondateur)	1,490	1,060	3,450	1,405	4,095
Chargeurs français (Plisson & Cie.)	1,410	1,825	4,800	1,395	6,500
Compagnie générale de navigation	545	511	875	500	1,075
Cie. havraise pénins. de navigation à vapeur .	3,820	3,100	4,500	3,820	6,100
Cie. générale transatl. (Act. ord.)	294	320	578	245	620
Cie. générale transatl. (Act. de prior.)	297	310	550	250	588
Est Asiatique français . .	240	248	325	230	428
Est Asiatique danois . . .	3,220	2,495	4,225	2,600	5,800
Maritime française	145	362	665	156	940
(nº 40.001 à 80.000) . .	60.25	—	—	53	209
Maritime et Commerciale de France	306	—	—	220	2,800
Maritime et Com. du Pacifique, Sᵉ A	—	—	—	—	—
Maritime et Com. du Pacifique (nº 6001 à 24,000)	—	—	—	—	—
Maritime et Com. du Pacifique (nº 24,001 à 48,888, Sᵉ B)	204	—	—	266	1,195

ANNEX IV *(Continued)*.

LIST OF PRICES QUOTED ON THE PARIS BOURSE *(Continued)*.

Name of Security	Rate on January 1917	Rate in 1919		Rate in 1920	
		Lower	Higher	Lower	Higher
Messageries fluviales du Congo	292	200	261	206	349
Messageries fluviales (Part)	315	300	460	295	560
Messageries fluviales (Cinquième)	62	51	94	50	116
Messageries maritimes (act. ord.)	272	295	695	248	718
Messageries maritimes (act. de prior.)	279	290	659	256	658
Messageries fluviales de Cochinchine	340	291	361	320	475
Navale de l'Ouest	920	—	—	975	2,700
Navigation de l'Afrique du Nord	357	—	—	250	600
Omnium maritime français	265	—	—	55	547.50
Pêcheries à vapeur (Soc. fr. de)	122	—	—	100	342
Sud-Atlantique	—	—	—	480	735
— (Parts)	70	—	—	57	200
Touage et de remorquage (Sté. gle. de)	161	131	214.50	125	255
Touage et de remorquage (Sté. gle. de) (Part de fondateur)	340	222	540	300	600
Transocéanique (Soc. de navig.)	525	—	—	525	565
Transports maritimes à vapeur (Sté. gle.)	1,160	1,350	2,800	990	3,270
Vapeurs français	140	191	300	120	310
Voiliers français (titre chamois clair jouissance)	430	395	450	430	—

According to the *Illustration Economique et Financière*.
Quarterly list of quotations 1921, first quarter.

IV.

MOTOR TRANSPORT.

Statement on the present situation of Motor Transport compared with the pre-war situation.

In 1913, the number of touring cars in France, according to the statistics of direct taxation, was 90,959, of which 69,032 were cars of more than two seats and 21,927 of one or two seats.

As lorries and light lorries in 1913 were not subject to any tax, they did not figure in the returns of the Revenue Department, but the number of vehicles in this category was ascertained in 1914—when they were all requisitioned—to be about 8,000.

One can therefore estimate that there were not more than 100,000 motor vehicles of all categories in France in 1914.

The Census taken at the beginning of 1920 by the Ministry of War for purposes of requisition showed :—

Vehicles of the 1st category	lorries, light lorries	41,320
» » » 2nd »	touring cars	103,155
	motor cycles	5,267

But the number of lorries and light lorries belonging to private individuals has considerably increased during 1920, not only through the disposal of war stocks but also by the construction of new vehicles.

The War Requisition Service estimates at about 70,000 at least the present number of private vehicles of the first category in France.

To this figure must be added 14,000 lorries belonging to the Army, and 9,000 at the disposition of the Ministry of the Liberated Regions.

We have, therefore, a total of 70,000, plus 14,000, plus 9,000—*i.e.* 93,000—lorries and light lorries at present on the French roads. The number of vehicles in this category is thus more than ten times the pre-war figure.

Touring cars have not increased in so great a proportion. The Ministry of War estimates their present number at about 110,000, an increase of 19,000 on the figure of 1913, that is to say about 20 %.

To sum up, the number of mechanically propelled vehicles existing in France has risen approximately from 100,000 in 1913 and 1914, to 206,000 in 1921 (of which five to six thousand are motor cycles).

It must not be assumed from these figures that the development of transport has merely doubled since 1914. The average daily mileage of a motor vehicle is certainly five or six times greater than that of a horse drawn vehicle, and the average tonnage carried per vehicle is also considerably greater.

The figures for the last six months in respect of circulation on the national roads shows—according to the first information, not absolutely precise, which it has been possible to obtain—that the increases in motor traffic vary, according to departments, from 100 to 850 % as compared with the census of 1913, and that—as might have been expected—the increases are due for the most part to the motor lorries, the number of which in 1913 was very small.

There is, it is true, a pretty general diminution in horse-drawn traffic. This reduction, however, does not seem to amount to more than from 12 % to 15 %, and may be considered negligible—from the point of view of the construction and upkeep of roads—in comparison with the increase in motor traffic.

The essential and permanent cause of this increase is the advantage of the automobile from the point of view of rapidity and mobility. But there are also other reasons, due to present conditions : the experience of and the taste for this mode of a transit acquired during the war by a great number of combatants, the sale of the stocks of the Allied armies the urgent demand caused by the resumption of the economic life of the country, which has been accentuated by the crisis in rail transport.

These different causes have stimulated the organization of public motor transport services, which before the war were mainly undertaken in regions difficult of access. To-day, the need of such services has become more imperious, because the construction of railways for local service has become extremely expensive. As a result of laws passed before the war and amended during the war, the State has been able by a system of pecuniary encouragement to help the departments and communes to develop this system of public transport.

At the present moment, without counting purely departmental systems, the State distributes annually more than 3,500,000 francs in subsidies to 91 enterprises, — working 185 routes, which have a total length of about 8,000 kilometres, and extend over 41 departments — for the daily transport, in both directions, of travellers, luggage, goods and merchandise. The means of still further developing this method of transport by a more elastic system of subsidies is under consideration. The credit figuring in the Budget in 1921 for State subsidies is 5,000,000 francs.

French Colonies.

RAILWAYS.

General Results of the Working of the System in 1913 and 1918.

Lines :

Haiphong to Yunnan Sen.
Hanoi to Namgnam.
Hanoï to Vinh Benthui.
Saigon to Mytho.
Saigon to Khanhoa.
Tourane to Dongha.
Ivory Coast.
Dahomey.
East Dahomey.
Dakar St. Louis.
Kagos to Niger.
Thies to Kayes.
Kayes to Ambidedi.
Guinea.
Tamatave to Antananarivo.
Reunion.
Djibouti to Addis-Abeba.
New Caledonia.

Years.	Average length of line worked.	Total Receipts.	Total expenses of working.	Net profit on working.	Proportion of expenses to total receipts.
1913....	5,276	34,343,970	23,235,051	11,108,919	70,5
1918....	5,972	49,757,562[1]	36,750,654	13,006,908	73,8
Lines from Karikal to Peralam Pondicherry to the River Gingy.					
1913....	36	367,489	231,701	135,788	63
1918....	—	—	—	—	—

---

[1] Not including 203,715 for East Dahomey, in respect of which the expenses and profits have not been stated.

Railways. — The following table gives the position of Colonial railways from January 1st, 1921 :—

Name of Colony.	Lines.		Totals.	Remarks.
	actually working.	under construction.		
French West Africa . . .	2,646 k.	201 k.	2,847 k.	
Madagascar	488	131	619	
Indo-China	1,660	108	1,768	Not including 464 k. in Chinese territory : Line Haiphong-Yunnan Sen.
Reunion	126	--	126	
Railway from Djibouti to Addis-Abeba	90	—	90	The line continues through Abyssinian territory for 696 k.
New Caledonia	29	—	29	
French India	30	—	30	
Totals . . .	5,069 k.	440 k.	5,509 k.	

Generally speaking, the lines and bridges, etc., are in a fairly good state of repair, although during the past few years repairs have had to some extent to be left over.

Plans for the construction of numerous railways to complete the systems in Indo-China, Madagascar, French West and Equatorial Africa, etc., are at present under consideration.

The rolling stock, which has not been in a sufficiently good condition of repair for several years, requires much renewal and improvement in various important respects. To cope with the traffic, an increase in the amount of the rolling stock is also essential on several systems.

FRENCH COLONIAL RAILWAYS.

General Fares and Rates for 1913 and 1920 of the Principal Systems.

1. *Passenger Traffic.*

Classes	Indo-China		West Africa		Madagascar	
	1913	1920	1913	1920	1913	1920
1st class	(1) 0,175	0,175	from 0,10 to 0,30	0,49	0,20	0,20
2nd —	(1) 0,0875	0,0875	from 0,06 to 0,20	0,315	0,10	0,10
3rd —	(1) 0,05	0,05	from 0,03 to 0,12	0,14	—	—
4th —	(1) 0,0175	0,0175	0,04	0,084	0,04 natives	0,06

Classes	Djibouti to Addis Abeba		Railways in Reunion		Dakar to St. Louis	
	1913	1920	1913	1920	1913	1920
1st class	0,60	1,20	0,10	0,14	0,12	0,35
2nd —	0,20	0,40	0,06	0,084	0,08	0,226
3rd —	—	—	—	—	0,055	0,10
4th —	0,05 natives	0,10	—	—	—	—

2. *Goods Trains.*

The general rates for goods trains in force on the different railway systems in the Colonies vary very considerably. Some of them are based on a sliding scale, others vary for the up and the down journey. The classification of goods also varies according to different colonies. Special rates have been drawn up to apply to the principal classes of goods carried by rail. Since the war, the general rates for goods trains have been increased on certain systems in proportions of from 40 to 100 %.

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[1] Fares reckoned at the rate of 2.50 to the piastre.

II.

WATERWAYS.

French West Africa.—The question of the stabilization and improvement of the mouth of the Senegal below St. Louis has been the subject of considerable study. The latest solution proposed would include two undertakings : the first with a view to the fixing of the mouth of the river ; the second with a view to the improvement of the bar thus fixed.

Furthermore, the question of the control of the River Senegal has to be solved, with a view to increasing the period during which this river is navigable.

French Equatorial Africa.—The numerous waterways of French Equatorial Africa can, for the most part, be made navigable by means of comparatively unimportant works.

Cameroons.—In order to allow of the exploitation of the vast forests, rich in rubber, traversed by the Nyong, dredgings, levelling of the river-bed, and a system of buoying on the sand-banks should be undertaken.

Sufficient material should be supplied to the local services to enable them to ensure, by means of their own resources, the navigation of the river with all the continuity and safety which are desirable.

Indo-China.—The inundations of the Red River have been, from time immemorial, the scourge of Tonkin. The consolidation of the dykes has involved considerable works, and these are as necessary as ever in view of the alluvial deposits which continually block the bed of the river.

Madagascar.—The Pangalanes canal, which joins up the lagoons of the east coast, is at present navigable for 300 km. This waterway must be improved and completed.

III.

PORTS.

French West Africa.

The Port of Dakar.—The extension of the port of Dakar has become an urgent necessity on account of the considerable development of traffic of this port since 1910. The present installations and the arrangements for loading and unloading are insufficient. Furthermore, the pea-nut trade is shifting its centre of activities and the port of Dakar is tending more and more to become this centre.

Platforms and quays should accordingly be made. Owing to the development of coaling operations, and the necessity of creating an important mazout depot, the extension of the anchorage grounds and the erection of new installations are essential.

Port of Kaolak.—Port connected with Thiès-Kayes by a branch line of 22 kilometres. The development of pea-nut cultivation in this district, of which Kaolak is the centre, requires the creation of new installation and the improvement of the entrance to the Salun river.

Ivory Coast.—As a result of the development of the forests, it is necessary to construct at Grand Basaam new export storehouses, a timber storehouse, a swing bridge and all the plant necessary to secure the maximum utilisation of the wharf. A second wharf should be installed at Vridi ; connection with Abidjan would be made by a ferry boat.

Togo.—The Lomé wharf was made in 1904. It is not in very good condition at present as a result of the damage caused by a tidal wave in 1911.

Dahomey.—The Cotonu wharf is in need of considerable repairs and additions.

Guinea.—The equipment of the port of Conakry is no longer sufficient for its present needs. Dredging is required in order to permit the approach of ships of 7 m. draught, and the port is also in need of plant indispensable for the handling of goods.

French Equatorial Africa.—The trade in Gabon timber tends to give the port of Gentil an ever-increasing importance. Though it may not be urgent at the moment to improve the conditions in respect of sea-going traffic, steps should, however, be taken to provide this port with better facilities for river navigation and for the transport of timber by barge. Lighthouses, signalling installations, lights and beacons, a coal quay, platforms and a repairing yard for ship hulls, etc., are therefore necessary.

The agricultural development of the Congo has given new importance to the river port of Brazzaville. In the first place the necessary constructions must be made to prevent silting, and a platform above high-water-level and moles for barging operations must be provided.

Cameroons.—The port of Duala is the sea-port which is the terminus both of existing and projected railway lines. The present equipment should be completed by the following operations :—

(*a*) Improvement and deepening of the channel so as to permit ships with a draft of 8 m. to enter Duala at all times.

(*b*) Construction of quays.

(*c*) Installation of signalling apparatus, lights, semaphores, buoys, etc.

(*d*) Reconstitution and improvement of the present floating material of the port.

Indo-China.—The present equipment of the ports of Saigon, Cholon and Haiphong should be completed so as to comply with the development of the countries whose products they handle.

Turan is the port of Central Annam and will later on be the port of Laos ; its development is essential.

Madagascar.—When the railways now projected are constructed, the present ports of the colony will have to cope with important commercial traffic. Provision must at once be made for the fitting up of these ports, notably Tamatave and Mejunga, and the improvement of their plant.

Reunion.—The Port of Pointe des Galets does not possess the equipment its traffic demands. Its present plant must also be adapted to the requirements of modern boats. Consideration must also be taken of the fact that labour is becoming ever scarcer and that it will be essential to have recourse to the handling of goods by mechanical methods, necessitating important installations.

St. Pierre and Miquelon.—The development of steam-boat fisheries necessitates the carrying out in this port of important enlargements and improvements, the establishment of new light-houses and safety installations (sirens, etc.).

Guiana.—The silt has recently been removed from the port of Cayenne. Immediate operations should be undertaken to prevent future silting in order to maintain free access to the port.

Numea.—The traffic of the port of Numea is continually increasing and the landing facilities are accordingly insufficient. The quay should be lengthened and dredging operations should be undertaken in order to create one or two landing stages in deep water for ships with a draught of 8 m.

French Somaliland.—The port of Djibouti is, by reason of its position, the port of call for ships proceeding from the Suez Canal to the Far East, Australasia, or the East Coast of Africa. It is also the natural outlet for Abyssinia. For these reasons it should be provided with the equipment which at present it lacks, including the creation of basins and quays, embankments and the installation of buoys, moorings, etc.

Martinique.—The port of Port-de-France, though admirably placed, is very badly equipped. In order to assure its future development, important works must be undertaken, especially the construction of embankments and quays, and the improvement of the plant.

Oceania.—The equipment of the port of Papeete is in a condition which requires immediate attention. The landing stages and haulage slips must be repaired, the channel must be deepened, and a signalling system (lights and beacons, etc.) must be installed.

Guadeloupe.—The port of Pitre-Point has only very elementary equipment and plant ; large ships are unable to approach it and manœuvre with rapidity. Quays and landing stages should be made, the entrances must be deepened and put in order, and beacons, buoys, etc., installed.

French India.—To lessen the inferiority of the ports of Karikal and Pondicherry as compared with the neighbouring ports of British India, the equipment of both ports must be improved by landing stages, quays, storehouses, plant, lights, signals, etc.

IV.

MOTOR TRANSPORT.

Madagascar.—The Motor Transport Service was working in 1913 on the following routes :—

Antananarivo	to	Ambositra	268 km.
»	»	Niarinarivo	99 km.
»	»	Maevatanana (Western road)	346 km.

In 1921, the following lines were being worked :—

Mananjary	Ambalavao	(Southern road)	88 km.
Antananarivo	Mananjary	» »	137 »
»	Marinarivo	» »	99 »
»	Maevatanana	(Western road)	346 »

Annual receipts :

1913	1914	1915	1916	1917	1918
273,080	272,256	291,739	430,084	578,327	500,285

Distances covered .

252,750 k.	273,920 k.	284,199 k.	404,551 k.	467,469 k.	500,411 k.

The Motor Transport Service, which has Jananarive as its centre, is completed by a subsidiary service, of which the head quarters are at Diego Suarez, between Antsirane and Cap d'Ambre (34 km.) and between Antsirane and Ambilobe (route des Placers) (138 km.).

The length of road covered by motor traffic was therefore :—

In 1913.	713 km.
In 1921.	1,242 km.

Upper Senegal and the Niger country.—A Motor Transport Service was established by decrees of the Lieutenant Governor, dated March 21st ned October 22nd, 1917, with a view to joining up Cotiari, the present, tarminus of the railway from Thies to Kayes with Ambidedi, and then with Kayes. The distance from Cotiari to Kayes is 264 km. The following fares have been adopted :—

First-class passengers, 250 fr., with 60 kilo. of luggage allowed free.
2nd-class passengers, standing or on goods trains, 75 fr., with 5 kilo. of luggage allowed free.

Dahomey.—In 1912 an automobile service was established on the Niger route between Savé, the present terminus of the railway, and the river.

This route has been open since October 1912, and although throughout its length of 483 km. its width varies considerably, vehicular traffic is possible throughout.

The receipts from the automobile service come from the postal service, the carrying of passengers, of luggage and of goods. The annual deficit of working is on an average 40,000 fr. ; but the political and economic results achieved by the service more than compensate for this small loss. Among other advantages, one may note that an unbroken journey — without portage — is now possible throughout the whole length of the route.

Since 1914, motor traffic has considerably increased in almost all French colonies, especially in the West Indies, by reason of the absence of railways connecting the factories with the ports.

End of Volume I.

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